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HEART CATHETERIZATION IN THE INVESTIGATION OF CONGENITAL HEART DISEASE*

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THE recent advances in the surgical correction of some congenital heart defects have made the more exact diagnosis of congenital heart disease a matter of considerable practical importance. The method of heart catheterization, which has been used extensively by a number of workers in the study of many cardiovascular problems, has recently been adapted to the investigation of congenital heart disease. The present report is based upon the study of 17 children with congenital heart disease in which this approach has been employed. The patients ranged in age from 19 months to 16 years. Four were cyanotic and the remainder acyanotic. During the investigation, all four heart chambers were entered, as well as the pulmonary artery and its branches, and the pulmonary veins.

HISTORY OF THE METHOD

Catheterization of the right heart in man was first demonstrated to be feasible by Forssmann¹ in 1929, but it was not until the careful work reported by Cournand and Ranges² in 1941 that the possibilities of this technique were recognized. Since then many excellent hæmodynamic studies have been carried out in normal individuals,^{3, 4, 5} and in patients with abnormal physiological states such as shock,⁶ post-hæmorrhagic fainting,⁷ anæmia,⁸ congestive failure and

the effect of digitalis on cardiac output and right auricular pressure.⁹

In the study of a congenital heart by this means, samples of blood are withdrawn from various parts of the heart and pulmonary tree. From a correlation of the oxygen content of the blood with the pressure exerted and the site of the catheter at the point where these observations are made, the course of the blood flow may be traced. Brannon *et al.*¹⁰ have reported their observations on 4 adult patients, between the ages of 32 and 68, with the clinical diagnosis of auricular septal defect. They demonstrated that the oxygen content of blood samples withdrawn from the right auricle was greatly in excess of that found in either the inferior or superior vena cava. It was evident that blood with a higher oxygen content was being added to the right auricle, presumably by way of an auricular septal defect.

Dexter and co-workers¹¹ have demonstrated a more complete exploration of the heart by passing the catheter into the pulmonary artery and its branches. In five cases of patent ductus arteriosus, subsequently demonstrated at operation, a higher oxygen content was noted in the blood drawn from the pulmonary artery than from the right ventricle. This was accounted for by the stream of arterial blood entering the pulmonary artery from the aorta by way of the ductus. In the two cyanotic cases which they reported, calculations were made of the pulmonary and peripheral blood flows.

Studies on two patients, aged 16 and 20, with a defect in the interventricular septum, have been reported by Baldwin *et al.*¹² Samples were taken from the right ventricle and arterialization of the right ventricular blood was regarded as evidence of an interventricular defect with a flow of blood from left to right ventricle. The pulmonary artery was not entered.

METHOD

The procedure employed is similar to that described by Cournand and Ranges.² The

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median cubital vein of either arm, or the saphenous vein in the thigh is exposed, and a ureteral type of catheter is introduced through a nick in the vein. These catheters are specially designed, with a curve in the distal end which straightens as the catheter is passed through a vein. When access to a cavity is gained, the curve is resumed. The operator thus has some control in directing the tip of the catheter. In children, an F8 or F9 catheter has been used. The catheter is introduced under fluoroscopic vision, passing into the right auricle, right ventricle, and the pulmonary artery and its branches.

Either arm may be used, but the left is preferred. In a number of instances some difficulty occurred in directing the catheter past the origin of the right innominate vein. If the approach is from the left side, the catheter appeared to pass more easily along the left innominate vein into the superior vena cava.

A slow drip of physiological saline is maintained throughout the procedure to keep the lumen of the catheter patent. Before blood samples are withdrawn, the drip is stopped and the first few c.c. of saline and blood are discarded. The necessity of disconnecting the apparatus for sampling or pressure recording is avoided by inserting a three-way stopcock between the catheter and the infusion flask.

In the earlier cases heparin was added to the infusion fluid, 1 c.c. per litre of saline. It is now felt that an additional factor of safety is provided by heparinizing the patient at the start of the procedure and maintaining a clotting time of 10 to 20 minutes by the capillary method (normal 3 to 7 minutes) for 24 hours afterwards. A heparin curve is done the day previous to the test, and from this information the necessary dose is estimated.

Penicillin is given intramuscularly for 48 hours following the procedure, 5,000 to 10,000 units every three hours, depending on the age of the child.

The pressure is recorded by a saline manometer and a Tycos dial. The latter is connected to the catheter by a tube, half of which is filled with water and half with air. The saline manometer readings averaged 11 mm. Hg. lower than the Tycos pressures. One-third of the distance from the sternum to the back at the level of the 3rd costal cartilage is taken as the zero point. It is noted that these readings represent mean pressures inasmuch as the system is not

sufficiently sensitive to record the systolic peaks and the diastolic depressions.

Blood samples for oxygen determinations are withdrawn under oil and transferred under oil into bottles containing sodium fluoride and potassium oxalate and are placed on ice and put in the refrigerator. The oxygen content is determined by the method of Van Slyke,¹³ using the manometric apparatus. With the exception of a few samples where only one determination was done, two determinations have been made on two machines by two operators, to check within 0.3 vol. %. An x-ray picture is taken at each site from which a blood sample is withdrawn. At the conclusion of the procedure a femoral artery puncture is done, and the oxygen consumption determined, using the Benedict-Roth apparatus.

In adult patients there has been no problem of sedation or anaesthesia, since the procedure, apart from the exposure of the vein, is not painful. With children some sedation is required to keep the patient still and, thus, in a more constant metabolic state. Table I summarizes the agents employed. Our feeling at the present time, with such experience as we have had, is that a preoperative hypodermic of morphia and scopolamine with or without nembutal by mouth, is the most desirable combination of agents.

The effect of these sedative and anaesthetic agents needs to be studied, by determining the oxygen content at one sampling site in the heart at intervals during the procedure. However, for purposes of diagnosis in this type of heart lesion it is probably not significant if the sedative agent changes the oxygen values as compared with the normal. Of the greatest importance is that it should not alter the oxygen content for the duration of the procedure.

Right heart catheterization is generally regarded as a safe procedure. In 1945, in a symposium on "Cardiac Output" at the American Physiological Society,¹⁴ Cournand was able to state that the method "has proved its safety in well over 1,200 cases, not only in ours but in the hands of a number of other investigators in England and in this country".

Surprisingly enough no arrhythmias, apart from extrasystoles, have been reported due to the stimulation of heart catheterization. In one of our cases (Case 16), a paroxysmal tachycardia had its onset after the catheter had been placed in the right auricle and apparently through the auricular septum into the left

TABLE I.
SEDATIVE AND ANÆSTHETIC AGENTS USED IN CASES OF HEART CATHETERIZATION

Case	Age	Preoperative medication	Medication at start of or during procedure
1	11 years.....	Nembutal gr. 3	
2	12 years.....	Nembutal gr. 3	
3	9 years.....	Nembutal gr. 3	Pentothal 825 mgm.
4	7 years.....	Morphine gr. 1/36 Scopolamine gr. 1/300	I.V. morphine gr. 1/4 Avertin rectal drip 3% Total approx. 150 mgm.
5	11 years.....	Morphine gr. 1/18 Scopolamine gr. 1/200	I.V. morphine gr. 1/8 Avertin rectal drip 3% Total approx. 240 mgm.
6	14 years.....	Morphine gr. 1/18 Scopolamine gr. 1/200 Nembutal gr. 1 1/2	I.V. morphine gr. 1/6 Avertin rectal drip 3% Total approx. 120 mgm.
7	9 years.....	Morphine gr. 1/36 Scopolamine gr. 1/300 Nembutal gr. 1	I.V. morphine gr. 3/16 Avertin rectal drip 3% Total approx. 210 mgm.
8	11 years.....	Morphine gr. 1/18 Scopolamine gr. 1/200 Nembutal gr. 1	I.V. morphine gr. 1/6 Avertin rectal drip 3% Total approx. 210 mgm.
9	19 mos.....	Morphine gr. 1/144 Scopolamine gr. 1/600 Nembutal gr. 1/4	I.V. morphine gr. 1/24 Avertin rectal drip 3% Total approx. 30 mgm.
10	7 years.....	Morphine gr. 1/36 Scopolamine gr. 1/300 Nembutal gr. 1	I.V. morphine gr. 3/16 Avertin rectal drip 3% Total approx. 230 mgm.
11	7 years.....	Morphine gr. 1/36 Scopolamine gr. 1/300 Nembutal gr. 1/2	I.V. morphine gr. 1/6 Avertin rectal drip 3% Total approx. 270 mgm.
12	3 years.....	Morphine gr. 1/72 Scopolamine gr. 1/450 Nembutal gr. 1/4	I.V. morphine gr. 1/16 Avertin rectal drip 3% Total approx. 120 mgm.
13	9 years.....	Morphine gr. 1/18 Scopolamine gr. 1/200 Nembutal gr. 3	
14	16 years.....	Morphine gr. 1/6 Scopolamine gr. 1/200	
15	9 years.....	Morphine gr. 1/24 Scopolamine gr. 1/300	
16	15 years.....	Morphine gr. 1/6 Scopolamine gr. 1/200 Nembutal gr. 1 1/2	
17	14 years.....	Morphine gr. 1/6 Scopolamine gr. 1/200 Nembutal gr. 1 1/2	

auricle. This episode is described in some detail in a separate case study.

Furthermore, apart from occasional instances of slight thrombophlebitis of the brachial vein, no residua of trauma to endothelial linings have been described. In this respect our experience with a sickly, markedly cyanotic infant weighing 19 pounds is of importance. In this patient, with a hæmoglobin of 22 gm. %, the catheter was introduced into the right saphenous vein near the femoral junction and passed easily into the right auricle without apparent ill-effect. The infant was heparinized for the duration of the procedure. One month following, death

occurred and a clinically unsuspected, well-organized thrombus was found occluding the inferior vena cava, both common iliac veins and the right renal vein, and a large thrombus was attached to the right auricular wall at the base of one leaflet of the tricuspid valve.

DISCUSSION OF CASES

Of the 17 patients studied, 9 were considered to have interventricular septal defects* in view of the information provided by catheterization. These cases were not cyanotic. In one there

* These cases are considered in detail in a separate report.

was evidence of an associated interauricular septal defect, and in another, the presence of a persistent left superior vena cava was demonstrated.*

The evidence for the presence of a ventricular septal defect is arterialized blood in the right ventricle, or blood with a significantly higher oxygen content than that found in the right auricle. Cournand *et al.*³ found that blood from the right auricle and the right ventricle, near the tricuspid valve in each instance, varied 0.3 vol. % or less, in 19 of 22 subjects without congenital lesions, and in only one instance was the difference greater than 1.0 vol. %. Whether or not blood with an oxygen value equal to that of arterial blood will be found in the right ventricle in the presence of a ventricular septal defect, will depend upon the position of the catheter tip at the time of sampling, and upon the size of the defect. The following illustrative case is presented.

Case 10 is that of an acyanotic boy of seven, with some limitation of exercise tolerance. There was a

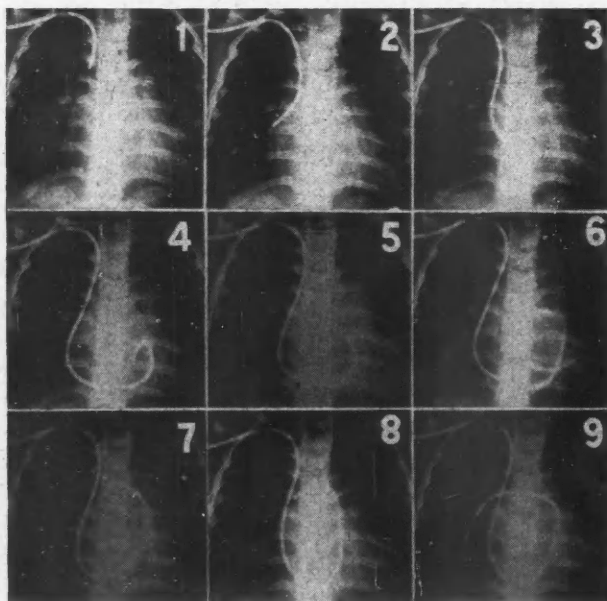


Plate 1. Case 10

	Oxygen content vol. %	Pressure mm. Hg.
Fig. 1.—Superior vena cava.....	10.0	8
Fig. 2.—Upper right auricle.....	10.4	10
Fig. 3.—Mid right auricle.....	10.6	10
Fig. 4.—Mid right ventricle.....	13.3	42
Fig. 5.—Upper right ventricle.....	11.0	36
Fig. 6.—Mid right ventricle.....	10.3	26
Fig. 7.—Main pulmonary artery.....	11.9	45
Fig. 8.—Right pulmonary artery.....	11.5	50
Fig. 9.—Right pulmonary artery.....	11.5	50
Femoral artery.....	13.4	

* This case is considered in detail in a separate report.

rough systolic murmur of moderate intensity maximal in the 3rd and 4th left interspaces near the sternum, associated with a thrill. Blood pressure 110/60, Hb. 11.7 gm. %. On fluoroscopic examination the heart was enlarged; the pulmonary conus area was prominent; there were increased vascular markings in the lung fields and there was questionable intrapulmonary vascular pulsation. The electrocardiogram was within normal limits. In the table beneath the x-ray pictures, it will be seen that the oxygen values in the superior vena cava and the right auricle were between 10.0 and 10.6 vol. %. In the right ventricle, the oxygen content varied between 10.3 and 13.3 vol. %. The latter figure is arterial blood, containing the same amount of oxygen as the femoral artery sample (13.4 vol. %). Arterialized blood must be entering the right ventricle, presumably through a defect in the ventricular septum. The right ventricle was demonstrated to be a large chamber, a finding which is particularly apparent in Plate 1, Fig. 6.

Case 6 is a boy of 14 in which the catheter was passed through a ventricular septal defect into the left ventricle. This patient, with marked cyanosis and clubbing, had a very limited exercise tolerance. There was a harsh systolic murmur of moderate intensity, maximal in the 3rd left interspace near the sternum. Hb. was 21 gm. %. The fluoroscopic examination demonstrated an unusually large aorta and an unusually small pulmonary artery, without enlargement of the heart. The electrocardiogram showed a marked right axis deviation.

In this instance the catheter was passed into the right auricle and through the tricuspid valve into the right ventricle, but it could not be made to enter the pulmonary artery. At a point in the upper part of the right ventricle it was seen to follow the course pictured in Plate 2, Figs. 5 and 6. Under fluoroscopy it was thought that the left ventricle had been entered, and this conjecture was supported by the oxygen content of 25.3 vol. % as compared with a value of 17.3 vol. % in the right ventricle. It is unlikely that blood was flowing from left to right ventricle because of the similar oxygen values in the right auricle and the right ventricle. The mixture of venous and arterial blood in this case presumably occurs in the aorta, *i.e.*, due to over-riding. That such may be the case is suggested further by the similarity in the pressure findings in each ventricle, indicating that each may be in communication with the arterial outflow tract.

There is one example of a patent ductus arteriosus in this series.

An acyanotic well-developed boy of 11 years (Case 1) with slight restriction of strenuous activity due to dyspnoea, had a continuous machinery-like murmur maximal in the pulmonary area. Blood pressure 100/30-0. The fluoroscopic examination revealed a prominent, active pulmonary conus area in a heart of normal size, and the aorta appeared smaller than normal. The electrocardiogram was within normal limits. The oxygen content in the right pulmonary artery, Plate 3, Fig. 1, was 12.9 vol. %, which was 1.2 vol. % higher than that found in the upper right ventricle, (Fig. 2). This is regarded as a significant oxygen difference at these two sites. Dexter, *et al.*¹¹ consider 0.6 vol. % to be the maximal difference between right ventricle and pulmonary artery in normal subjects.

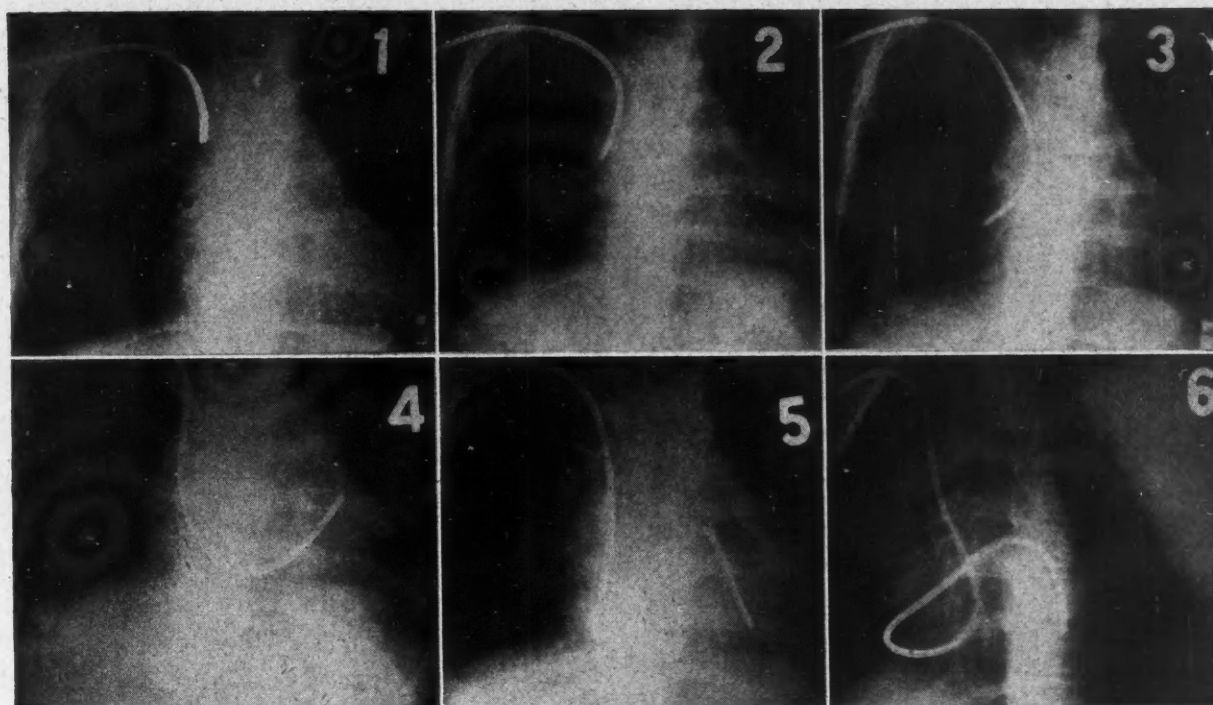


Plate 2. Case 6

	Oxygen content vol. %	Pressure mm. Hg.		Oxygen content vol. %	Pressure mm. Hg.
Fig. 1.—Superior vena cava.....	17.1	18	Fig. 4.—Upper right ventricle.....	17.3	56
Fig. 2.—Upper right auricle.....	17.0	18	Fig. 5.—Left ventricle—A.P.....	25.3	64
Fig. 3.—Lower right auricle.....	17.0	22	Fig. 6.—Left ventricle—(left ant. obl.)

At operation, Dr. Dudley E. Ross ligated a large ductus with the subsequent disappearance of signs and symptoms.



Plate 3. Case 1

	Oxygen content vol. %
Fig. 1.—Right pulmonary artery.....	12.9
Fig. 2.—Upper right ventricle.....	11.7

There are two cases which demonstrate an auricular septal defect with a flow of blood from left to right auricle. The existence of such a flow is deduced from the presence in the right auricle of blood with an oxygen content higher than that entering it from the venæ cavæ. In each of these cases the left auricle has apparently been entered by the catheter.

A boy of 9 years (Case 13) complained of moderate limitation of activity because of dyspnoea. He was not cyanotic ordinarily, but the parents noted slight blueness of lips and fingernails occasionally following exertion. On physical examination there was a systolic murmur of moderate intensity, maximal in 2nd and 3rd left interspaces near the sternum, with an early, slight diastolic blow in the same area. The pulmonic second sound was accentuated. Blood pressure 110/70; Hb. 12.3 gm. %. Fluoroscopic examination showed the heart to be enlarged, with a very prominent and active pulmonary conus region. The aortic arch was smaller than normal; there was marked intrapulmonary pulsation of the pulmonary vessels. The electrocardiogram showed a right axis deviation and a QRS time of 0.11 sec.

The catheter once having gained the right auricle would then follow one of two routes. It was introduced either into the right ventricle through the tricuspid valve, or it was passed through the auricular septum into the left auricle and into a pulmonary vein. The x-rays, (Plate 4, Figs. 1 to 8) show the course of the catheter in this latter route. In Figs. 6, 7 and 8, the catheter is beyond the heart shadow. From the data in the table below the photographs, it will be seen that there is a difference of 3.4 vol. % in the oxygen content between the superior vena cava and the right auricle. Despite the omission of a sample from the

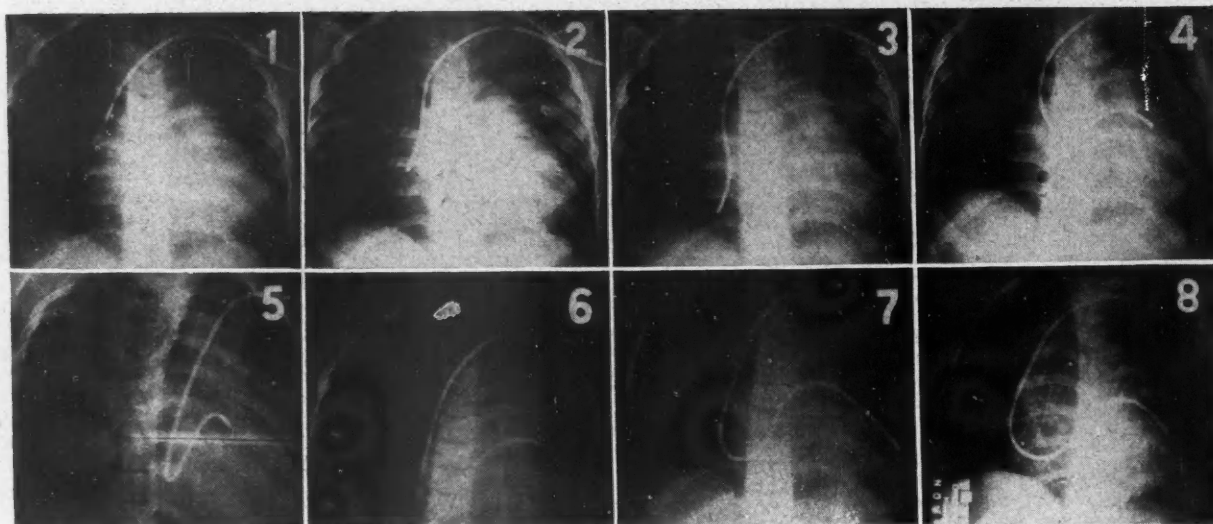


Plate 4. Case 13

	Oxygen content vol. %	Pressure mm. Hg.		Oxygen content vol. %	Pressure mm. Hg.
Fig. 1.—Superior vena cava	10.5	18	Fig. 5.—Left auricle (right ant. obl.)
Fig. 2.—Upper right auricle	13.9	18	Fig. 6.—Pulmonary vein	15.7	26
Fig. 3.—Lower right auricle	13.3	..	Fig. 7.—Pulmonary vein	16.1	29
Fig. 4.—Left auricle	15.7	20	Fig. 8.—Pulmonary vein (left ant. obl.)

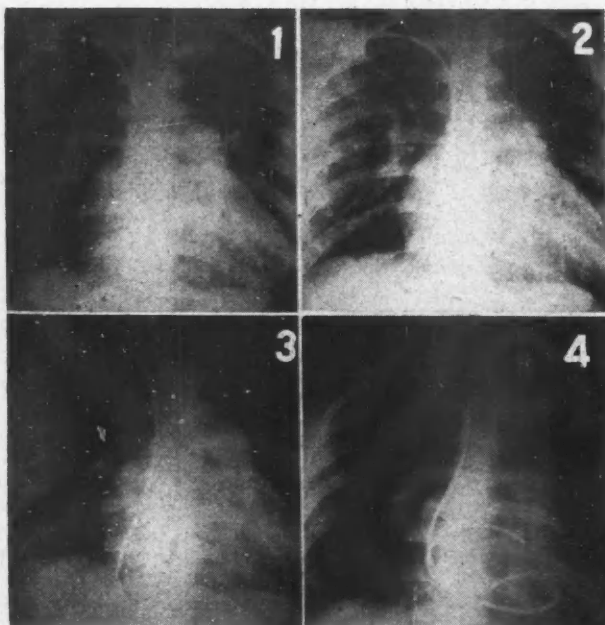


Plate 5. Case 16

	Oxygen content vol. %	Pressure mm. Hg.
Fig. 1.—Superior vena cava	9.7	22
Fig. 2.—Mid right auricle	15.6	..
Fig. 3.—Inferior vena cava	11.2	22
Fig. 4.—Left auricle	16.9	20

inferior vena cava, it is thought that this finding is evidence for a flow of blood from left to right auricle through a defect in the auricular septum traversed by the catheter. Arterialized blood was found in the pulmonary vein and in the left auricle.

The second case* of auricular septal defect was found in an acyanotic girl of 15 without symptoms. On physical examination there was a systolic murmur of moderate intensity maximal in the 2nd and 3rd left interspaces near the sternum. On fluoroscopic examination, the heart was enlarged, particularly the right ventricle. There was marked prominence of the pulmonary conus area and a hectic pulsation of the pulmonary artery. There was a questionable pulsation of the intrapulmonary vessels. The aortic arch appeared to be smaller than normal. The electrocardiogram showed right axis deviation.

The catheter was easily introduced into the right auricle. A loop then passed through the tricuspid valve, as shown in Plate 5, Fig. 4, but the course of the tip was to the left and slightly upwards. The oxygen value at this point was 16.9 vol. %. The superior and

* Referred for study from the Cardiac Clinic of the Jewish General Hospital, Montreal, by Dr. Harold N. Segall.

inferior vena caval blood had an oxygen content of 9.7 and 11.2 vol. % respectively, as compared with 15.6 vol. % in the lower right auricle. It was apparent from these data that arterialized blood must be entering the right auricle. The tip of the catheter probably lies in the left auricle in Fig. 4 in view of the high oxygen content at that point. This finding was not investigated further in view of the onset of a paroxysmal tachycardia when the catheter was in this position. A blood pressure drop to 70/50 occurred and the paroxysm continued for two hours when it ceased spontaneously. The electrocardiograms may be interpreted as either a paroxysmal auricular tachycardia or as a paroxysm of 1-to-1 flutter. The onset of such an arrhythmia during catheterization has not previously been reported. The patient gave no history to suggest episodes of tachycardia.

In the course of this study, it was observed, during the placing of the catheter under fluoroscopic vision, that an excellent estimate of the size of the right ventricle could be made. An illustration of the catheter tip outlining the right ventricular wall is shown in Fig. 9, Case 10. In some instances where the catheter was curled up in the right auricle, it was thought that a good approximation of the size of this chamber could also be made. The movements of the catheter tip were much more vigorous in the right ventricle than in the right auricle; and in the pulmonary artery there was a characteristic motion of the catheter in the longitudinal axis of the vessel.

The tricuspid valve was entered at a level between thoracic 7 and 10. The surprising extent to which the valve was stretched was noted particularly when withdrawing the catheter from the right pulmonary artery. The main fulcrum of the tension of withdrawal was at the upper edge of the valve.

CONCLUSION

The method of heart catheterization, in our limited experience and according to the few reported cases in the literature, appears to be a most useful adjunct in the investigation of congenital heart disease.

We wish to acknowledge our indebtedness to Dr. Lewis Dexter, Peter Bent Brigham Hospital, Boston and Dr. André Cournand, Bellevue Hospital, New York, for their advice. We appreciate the assistance given by members of the staff of the Departments of Radiology, Anaesthesia and Haematology and of the Operating Room, of the Children's Memorial Hospital.

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SOME OBSERVATIONS ON NASAL CILIA*

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DURING the past twenty-five years, our knowledge of the physiology of the nose has been greatly increased and the accumulation of this knowledge has changed entirely our mode of treatment in nasal infections.

A brief anatomical review will help to clarify the picture. The nose is made up of two fairly rigid channels about three to three and a half inches in length beginning at the nostril and ending posteriorly in the nasopharynx. The septum or partition between these two channels as a rule has deflections or ridges varying in degree even in healthy noses. The lateral wall has three rounded bodies or turbinates running from before backward and parallel to one another. According to their location, the sinuses are named the antrum, frontal, ethmoid and sphenoid. These large cavities empty into the nose by small openings or ostia under the lower edge of the middle and superior turbinates. The sphenoid is the exception and opens into the space just above and behind the superior turbinate. The whole nasal mucous membrane, including the anterior ends of the inferior and middle turbinates, is completely covered with cilia with the exception of the olfactory area. These ciliated cells rest on a basement mem-

* Presented at the McGill Reporting Society, October 8, 1946.

brane and extend through the entire layer of epithelium ending on the surface in the cilia. In humans, nasal cilia are about 7 microns in length, that is, slightly larger than a red corpuscle and the space between each cilium is approximately equal to its own diameter.¹ These microscopic hairs are packed tightly together like the pile in a rug and extend from just inside the nostril to the level of the Eustachian tube. Below this area the epithelium is squamous.

Although we have learned a great deal about cilia in the past two decades, we are apt to forget that their presence and motion were observed over a century ago. In 1830, Sharpey² described extensive studies he carried out on ciliary activity. He gave credit to Purkinje and Valentin³ who first mentioned the movement of cilia in mammals. They carefully noted the motion of cilia:

"On the mucous membrane of the nose and its sinuses, and that of the Eustachian tube, also on the lining membrane of the lower part of the larynx, the trachea, and bronchial tubes, extending to their smallest divisions capable of examination. No trace of it can be found in the glottis, nor in the mouth and pharynx."

By means of powdered charcoal injected into the nose and sinuses of rabbits, Sharpey studied the pathways of ciliary activity.

"On breaking open the maxillary sinus and trying its lining membrane in the same way, the impulsion seemed to be directed towards the back of the cavity, where its opening is situated. By the same means I traced the direction in the windpipe of a young dog a few days old; the impulsion was best marked on the posterior part of the tube, and there it was obviously directed towards the larynx. . . ."

Many of Sharpey's careful observations have only recently been corroborated. For instance, he noted that cilia were tough, hardy structures that kept on beating long after death of the animal. He observed the effective and slower recovery stroke of cilia and also measured their length. He also described the effect of drugs on ciliated mucous membrane. In part he said, "Acid, alkaline, and saline solutions, when concentrated, arrest the motion instantaneously; dilution to a degree varying in differing substances, prevents this effect altogether, and a lesser degree of dilution delays it". Among the solutions he used were alcohol, quinine, ether, atropine and morphine.

In 1924, Yates⁴ injected a solution of dye into the various sinuses and mapped out the tracks down into the pharynx. He found that the solution followed definite pathways due to

the action of the cilia running downward and backward. From the antrum, frontal sinus and anterior ethmoid cells, the dye emerged under the posterior tip of the middle turbinate and streamed down in front of the Eustachian tube. Here it was joined by a stream from the posterior ethmoid cells which appeared from the ostia under the superior turbinate. This followed down to the level of the soft palate where it united with a smaller stream from the posterior ethmoid cells which went behind the Eustachian cushion. The combined tracks continued down the posterior pharyngeal wall just medial to the posterior pillar of the tonsil. The stream from the sphenoid ostium followed a constant path down the posterior pharyngeal wall well behind the Eustachian cushion and joined the combined streams from the other sinuses about half an inch below the lower margin of the soft palate.

CILIARY MOVEMENTS

The motion of the cilia is whip-like, with a quick effective stroke in the direction of the flow of the overlying mucus and a slower recovery stroke in the opposite direction. When seen in profile, cilia appear to beat in sequence, forming waves which have been compared to a field of waving grain as the wind passes over it. In a localized wave no two cilia are in exactly the same phase at the same time. Viewed from above small groups seem to work in unison while others rest. They move to and fro at the rate of 5 to 12 cycles a second but the mechanism which stimulates these hair cells is undetermined.⁵ Whether the wave-like motion is controlled by the sympathetic or autonomic system or whether biochemical changes in the cell protoplasm are responsible is not known.

According to Hilding⁷ the anterior third of the nose shows very little ciliary movement, while the posterior two-thirds shows active motion. On the inactive area anteriorly which includes the anterior ends of the inferior and middle turbinates drops of India ink move downward and backward very slowly at the rate of only a few millimetres an hour into the middle and inferior meatuses (Figs. 1 and 2). In the active area just behind the anterior ends of the inferior and middle turbinates to the Eustachian tube the movement is much more rapid. Moving at a speed of 4 to 6 mm. per minute, foreign particles reach the level of the

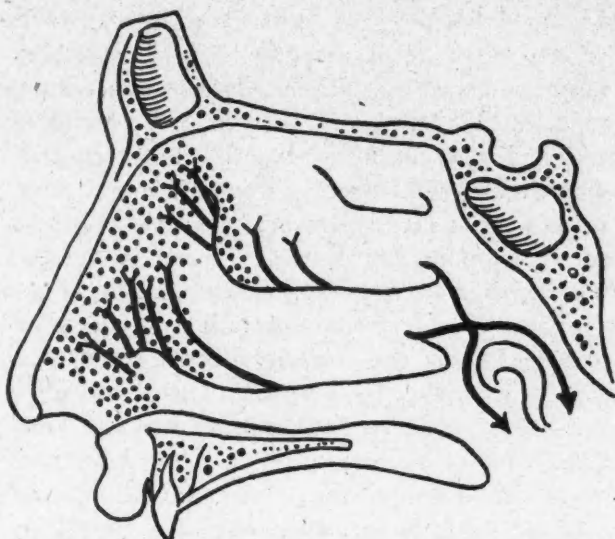


Fig. 1.—The direction of the flow of mucus over the non-ciliated surface in the anterior portion of the nose. The stippled area is non-ciliated and inactive.

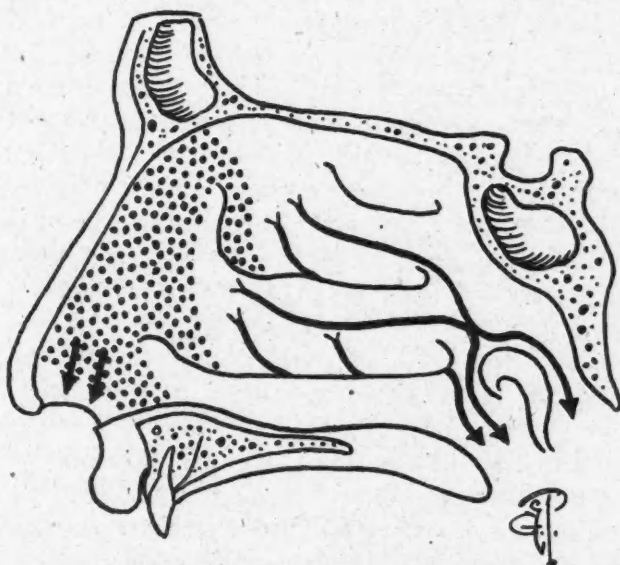


Fig. 2.—The direction of the flow of mucus over the ciliated surface on the lateral wall of the nose. The non-stippled area posteriorly is ciliated and active. (Modified after Hilding).

opening of the Eustachian tube in 4 to 10 minutes.

Ciliary movement is greatest in the meatuses and particles from the anterior inactive area gather speed as they reach these parts. In the same way the anterior third of the septum is inactive and movement is 4 to 6 mm. an hour while in the posterior two-thirds it is the same as on the lateral wall, 4 to 10 mm. per minute.

LAYER OF MUCUS

Overlying the tips of the cilia but not touching the cells beneath is the thin, transparent continuous sheet of mucus which keeps moving

toward the back of the nose. This layer of mucus which extends from the deepest recess of each sinus converges at the ostium and then streams over the lateral wall of the nose in definite pathways to reach the nasopharynx.

As it moves along, this thin film of mucus, which has been compared to a conveyor belt, is being constantly replaced from the mucous and serous glands of the nasal mucosa. This protective coating carries away foreign particles and bacteria which have passed the vibrissæ just inside the entrance of the nostril. For this reason the deeper recesses of the nose are often sterile on culture.⁶ Normal mucus is thin, invisible and very elastic so that it can be stretched considerably before it breaks away. It varies in consistency but is made up of about three parts mucin, two parts salt and ninety-five parts water.

There is then a completely new sheet of mucus over the anterior inactive area every hour or two and a new layer of mucus over the posterior two-thirds about every 10 minutes. When the film of mucus reaches the Eustachian tube it is helped along by the act of swallowing, by traction and slightly by gravity until it is swallowed or cleared away by coughing.

From the foregoing statements, it would appear that an abundance of healthy mucus would go a long way in relieving excessive dryness in the nose and clearing away infection. Whether this can be done by stimulating the mucus-secreting glands or by supplying the necessary mucin locally remains to be proved.

METHODS OF FOLLOWING CILIARY MOVEMENTS

Many of the observations that have been mentioned can easily be demonstrated by means of animal charcoal or lamp black. Dotted or sprayed in the nose, these innocuous substances can be followed with the aid of the nasopharyngoscope as they are carried along by the cilia. After experimenting with various powders and solutions a mixture of powdered carmine 90% and di-sodium phosphate 10% was found satisfactory. This finely ground, odourless powder is quite harmless, it does not clump, it is not objectionable to the patient and its brilliant red colour is easily seen in the dark recesses at the back of the nose. By means of a malleable cannula fitted to an ordinary DeVilbiss atomizer bulb, it is a simple matter to blow a little of the carmine and di-sodium phosphate powder into any desired

area of the nose and study its progress to the nasopharynx. It was found that a little cup or funnel connected to the end near the bulb was a great asset in holding the powder as the head could then be held in an upright position.

Hundreds of cases have been studied in this way by blowing the powder on to various spots of the septum and on the lateral wall, as well as by using a solution of the red mixture in all the sinuses under varying conditions. Yates mentioned that solution injected into a normal antrum appeared in the nasopharynx in about two minutes. Normal sinuses were injected, also those in which subacute sinusitis was present and after the infection had subsided. Patients suffering from chronic sinusitis with and without polypi were examined. Also those with vasomotor rhinitis and seasonal hay fever were carefully studied and the ciliary movement recorded.

CILIARY PATHWAYS

Two important points should be mentioned, (a) that after removing completely the lining mucous membrane from a patient's sinus, normal appearing and normal functioning mucosa complete with cilia regenerates in about five months;¹⁰ and (b) that cilia beating vigorously are frequently found in cases of chronic sinusitis, and even when bathed in pus.¹¹

Ciliary pathways themselves are very definite apart from slight variations. For instance, a little of the red powder blown into the middle meatus of a normal nose can easily be seen in the post-nasal mirror within a few minutes. In about five minutes a definite stream shows in the pharynx just medial to the posterior pillar. The powder tracks down from under the posterior tip of the middle turbinate in front of the Eustachian tube and although most of it runs down the lateral pharyngeal wall, traces of the powder spread over the surface of the tonsil. This might easily explain a continued low grade tonsillitis.

On injecting a little powder into an antrum after an infection has subsided, the powder can be seen in the nasopharynx within a few minutes. By this means, we can assume that the mucous membrane has returned to normal. Even in the presence of chronic infection in an antrum, the carmine powder mixes freely with fluid pus and often appears at the level of the

Eustachian tube in 5 to 10 minutes. In cases where pus is thick and curdy, it moves away more slowly and sometimes takes half an hour to appear behind the soft palate. Whether this delayed action is due to the extra load embarrassing ciliary action or to the cilia being injured or destroyed in certain areas, remains to be shown. On several occasions a little powder has been blown into an antrum just previous to a radical operation and the pathways noted on opening the antrum. The drainage is invariably in a spiral direction toward the ostium even in the presence of polypoidal thickening and free pus. In a number of cases of sphenoiditis with pus emerging from the ostium, carmine powder injected into the sphenoid streamed out easily with the pus and showed at the Eustachian tube level within 5 to 10 minutes.

Powder sprayed into the nose over a marked deflection of the septum tends to remain for half an hour or more. It is sometimes an hour before the convex surface is free of powder, due to degeneration of the cilia. The inspired air drying the septum aggravates the condition. The same condition holds true for ridges and spurs on the septum. Over the anterior exposed areas ciliary streaming is delayed, while on the protected under surface where the cilia are intact and active, the powder moves downward and backward more quickly.

During the hay fever season a great many cases have been examined in this way and the following facts noted. An allergic condition itself does not interfere with ciliary movement. The pale, boggy, water-logged tissue carries the powder away from the inactive and active areas in a similar way to that mentioned for normal mucous membrane, except where there is an excess of watery mucus present. In these cases, even in the active areas, thin streaks appear but they often remain and sometimes move only a few millimetres in half an hour in the "stagnant" watery secretion. On the other hand, if the mucus has the proper viscosity, it moves along at the normal rate. In chronic ethmoiditis with polypi present, powder blown on to the anterior surface of polypi remains for a long time. This is again due to the disappearance of the cilia from the anterior exposed surface while on the posterior protected surface of the polypi, the powder drains away more freely.

EFFECTS OF MEDICATION ON CILIA

For some years now it has been known that certain drugs are harmful to the nasal mucous membrane. Many preparations used empirically in oily solutions by spray or dropper have been found to interfere with the action of the cilia. Menthol, camphor, thymol, and oil of eucalyptus,⁸ to mention a few, tend to injure the mucous lining when used over long periods.⁹ As a result, mild shrinking agents which are isotonic, slightly acid, and do not interfere with ciliary streaming would seem most satisfactory from a physiological standpoint.

CONCLUSIONS

These findings suggest that an abundant supply of healthy mucus in the nose is more helpful than strong nasal medication. While it seems reasonable to assume that we should strive to eliminate pathogenic organisms, it is important to remember the normal protective mechanism of the nose. In short, our aim should be to preserve the natural defences of the nose by ventilation and drainage but it is also necessary to have the proper amount of moisture present, so that normal ciliary action is not impaired.

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RÉSUMÉ

L'appareil nasal est normalement pourvu de défenses naturelles qu'il faut respecter. Sans nier les bienfaits de la médication moderne, il ne faut pas ignorer le rôle que jouent les vibrisses et le mucus nasal et il importe de conserver au cours des infections nasales le fonctionnement aussi parfait que possible de ces agents défensifs de première importance. En somme, en même temps que l'on songera à la médication indiquée, on veillera également à assurer le drainage des sécrétions, normales et pathologiques, et à maintenir les vibrisses au degré d'humidité qui soit compatible avec leur bon fonctionnement.

JEAN SAUCIER

A NEW METHOD OF URETEROINTESTINAL ANASTOMOSIS PRIOR TO TOTAL CYSTECTOMY FOR CARCINOMA OF THE BLADDER

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HINMAN, and Hinman and Weyrauch, in a complete review of the subject of uretero-intestinal anastomosis up to 1939, found that more than 6 different techniques had been used in approximately 1,000 cases. Hinman divided the procedures into four groups: (1) those utilizing the intact orifice; (2) those employing the "muscularizing" principle; (3) those using the submucosal principle (after Coffey); and (4) those in which the ureter is kept intact. An analysis of the mortality in these cases, excluding those in group (4) in which the number was very small, showed an over-all mortality of 31%. The death rate was 21% in those in whom the operation was performed for benign lesions, and 52% in those in whom cancer was present. The results were best, but not greatly different from the average, in those cases in which Coffey's methods, or some modification of it, was used. This clinical review, in addition to an experimental study of 170 ureteroentrostomies in dogs and a review of his own cases done by modification of Coffey's No. 1 method, led him to the following conclusions:

"The processes of restoration of an orifice and of repair of the surgical approach to it largely determine the result of uretero-intestinal infixion. Changes in the ureter have the greatest significance in these processes. The control of the destiny of the end of the ureter in the head and hand of the surgeon would more than half solve the problem. What are the changes in the ureter? The new urinary meatus is formed by nature. Nature's orifice results only after the end in excess has sloughed off, or after healing by granulation of the side-to-side intercommunication, beyond surgical control in either case. The sloughing off of the end in excess is determined by the extent of endarteritis and anæmic necrosis, differing by inevitable infection from the similar fate of ureteral redundancy in ureterovesical reimplantation. Leaving the end which hangs redundant long or short makes no difference in the results. Almost invariably the restored orifice will be found in a papilla and always inflammatory if examined early. Occasionally massive necrosis of the ureter ran up two or more inches above the place of surgical infixion breaking the anastomosis and causing peritonitis."

In an experimental evaluation of Coffey's method, Vermooten showed that a conspicuous cause of failure was the occurrence of a large periureteral exudate surrounding the imbedded

portion of the ureter which either caused complete breakdown of the anastomosis or resulted in excessive scar tissue formation, producing mechanical ureteral obstruction. He felt that this exudate was due to infection from bowel contents.

A review of the literature and our own clinical experience with the techniques of Coffey and their modifications showed that two difficulties were encountered: (1) peritonitis; and (2) changes in the region of the anastomosis which initiated ureteral obstruction and infection. The causes of peritonitis were of two different types: (1) technical errors associated with fistula formation and leakage, and (2) break-down in the region of the anastomosis, with fistula formation which did not seem to be associated with any technical error. The dangers of peritonitis could be avoided to a great extent by extraperitonealizing the region of the anastomosis after the method of Mayo. The second difficulty, break-down in the region of the anastomosis, local infection, and ureteral obstruction could not be avoided with certainty by extraperitonealization, careful pre- and post-operative care of the bowel, or the judicious use of the newer chemotherapeutic agents.

In reviewing the literature especially the recent work of Jewett, and the reports of cases in which treatment was given by means of the fourth principle, the intact ureter, one is struck by the fact that in the successful cases the percentage of beautifully healed anastomoses is high and the late results are good. This was true in our experience. Why is this? Apparently by the use of the intact ureter healing of the anastomosis is good, with little peri-ureteral fibrosis as a result of previous acute inflammatory reaction. Later communication with the bowel brought little difficulty and an excellently functioning anastomosis. Jewett, Ferguson, Higgins, and others, who have used the method of the intact ureter have attributed this to the fact that there is no communication with the bowel during the time of healing between the ureter and the adjacent bowel, so that no organisms could creep into this bed and produce the inflammatory exudate which Vermooten has described in his experimental anastomoses on dogs. However, in the literature, in Hinman's experience and in my own experience, urinary tract infection and ureteral obstruction occurred not infrequently, even though the intact ureter was used and the

anastomosis was made later by a technique similar to Jewett's. This is probably due, as Jewett emphasizes, to kinks, surgical oedema, etc., but these seem to occur even with the most careful technique, and when they do, they are serious and require either nephrectomy or drainage of the ureter above the region of the anastomosis. Moreover, the second stage of the procedure in which a communication between the ureteral lumen and the bowel is formed, has been performed differently by many individuals and presents many problems.

Higgins, who first performed this type of operation clinically, used the method of the sloughing suture. In our experience, this has been unsatisfactory in that the amount of slough, the time of slough, the kinds of orifices that it produced, are all uncertainties and if the ureter happens to be blocked by surgical oedema or kinking, one cannot make the communication immediately. Stricture formation has also been described following this procedure. The method of Jewett is excellent except that the second surgical procedure needs excellent exposure, which the formation of adhesions after the primary operation makes difficult. Also, the manipulation incident to obtaining the necessary exposure may tear down the anastomosis between the walls of the ureter and sigmoid colon. Could such a secondary procedure be avoided?

Thus the use of the principle of the intact ureter seemed to be the method of choice. It presented, however, certain technical problems: (1) burying the intact ureter was frequently associated with severe obstruction and infection, and (2) the production of a communication between the ureter and bowel at the second stage was difficult, and at times uncertain. Two major procedures were necessary for the consummation of the anastomosis.

Because local infection and ureteral slough occurred in all methods not using the intact ureter, even with careful bowel asepsis, careful placing of sutures, and avoidance of contamination, and the occurrence was uncertain but more frequent in older individuals than in children with extrophy, I postulated that the prime cause of this was not the infection spreading into the ureteral bed from the bowel but ureteral slough due to the disturbance of the ureteral blood supply, when this is cut across. When the ureter is buried in the wall of the colon, at first the blood supply must be

obtained from the outside through the wall of the ureter. If the ureter is intact, blood may enter from above and below. If the ureter has been cut across, blood may enter only from the proximal portion (Fig. 1). Slight oedema causing pressure may so deplete the blood supply that although slough due to this only did not occur, resistance to infecting organisms is greatly reduced and the combination of oedema and infection excludes any possibility for control of the destiny of the end of the ureter.



Fig. 1.—X-ray photograph of the bladder and ureter following the injection of the inferior vesical artery with a barium mixture. Note that the arteries of the lower three-fourths of the ureter are thus injected. A good deal of the blood supply to the ureter comes from below.

Assuming, therefore, that the importance of the principle of the intact ureter is not primarily a question of contamination of the ureteral bed with organisms, but rather the maintenance of adequate ureteral blood supply, I have devised a technique (illustrated in the diagrams) which creates the anastomosis in the first stage, leaves the ureter intact so that the blood supply to the region of the anastomosis is maintained, and drains the proximal ureter by means of a small ureteral catheter. This procedure, as contrasted with other techniques, has these advantages: first, by the use of the almost intact ureter it maintains blood supply to the region of the anastomosis; second, by creating immediately an anastomosis around the ureteral catheter the danger of ureteral obstruction due to surgical oedema or kinking is obviated and in the operations thus far performed, no evidence of severe, immediate obstruction or infection has occurred. The temperature curve of every one of these patients has shown

practically no deviation from the normal; third, because the anastomosis is completed in the first stage, no second operation of great magnitude is necessary and the technical problem of avoiding adhesions or freeing the region of the anastomosis, in the face of adhesions, with the dangers of tearing and destroying the new blood supply which has been created for the region of the anastomosis, is abolished. The second operation is done extraperitoneally, away from the region of the anastomosis and is a very minor one.

In my hands the operation has proved satisfactory in the eight patients treated since July, 1945. No deaths due to the operation have occurred. The postoperative convalescence has been remarkably smooth and the postoperative intravenous pyelograms have shown very few changes. It is too early to say anything about later changes in the urinary tract, but from the appearance of the pyelograms and the course of the patients, it would seem that these will not be extensive.

METHOD

The method is as follows: A suprapubic incision is made and the abdominal cavity entered. The region of the sigmoid colon and the lower portion of the ureters is exposed, the parietal peritoneum is incised and the intact ureters are freed by blunt dissection. They are then buried in adjacent portions of the sigmoid colon, as illustrated in Figs. 2 and 3, after a communication is made at the midpoint of the anastomosis, through which a ureteral catheter is passed down a rectal tube so that it can be pulled out and sutured to the anus. This can later be irrigated and removed at will. The ureter is buried submucosally with interrupted silk sutures. The region of the anastomosis is extraperitonealized by suturing the parietal peritoneum over it with interrupted black silk sutures. A heavy steel or silk suture is placed, untied, around the portion of the ureter emerging from the anastomosis and is brought out through a stab wound near the anterior superior iliac spine, extraperitoneally and adjacent to a pack or rubber tube which keeps this region open.

After a similar procedure is carried out on the opposite side, the midline incision is closed in the usual manner without drainage. The ureteral catheters are kept draining easily and, if they clog, the urine appears promptly in the

rectal tube which is put in immediately after the operation. A Wangenstein suction apparatus is used for two days and then the diet is gradually increased. Two weeks later under pentothal anaesthesia the sutures on the distal ureters are tied and the drains in the small lateral incisions are removed. Two days after this the ureteral catheters are removed. By this time the patient is up, eating all kinds of food, and is beginning to establish his new bowel habits. He is ready for cystectomy at any time, if this is to be done.

A 54 year old white male entered the University Hospitals on October 26, 1945, complaining of gross haematuria for two months, associated with a good deal of bladder irritation. For 35 years he had worked in a photographic laboratory handling dyes which may be analine. General condition was good. There was an enlargement of the prostate, benign, and to bimanual examination a mass could be felt about the size of a

plum, tender and movable. Intravenous pyelograms were normal. Cystourethrograms showed the presence of a tumour about the bladder neck. A transurethral resection was done on October 27. On the left lateral



Fig. 4.—Illustrates condition of ureterointestinal anastomosis in patient who had bilateral operation four months previously. Excellent function with very little ureteral dilatation or kidney infection. Patient died of inoperable extensive carcinoma of the bladder. Note absence of periureteral fibrosis. Communication with lumen of bowel was perfectly healed and looked like the ureteral orifice in a normal bladder.

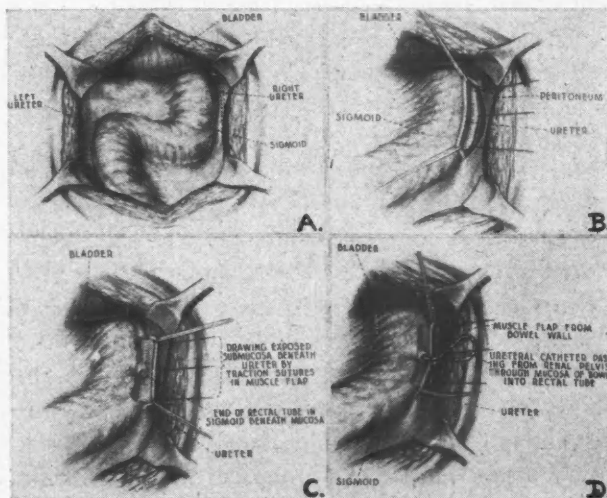


Fig. 2

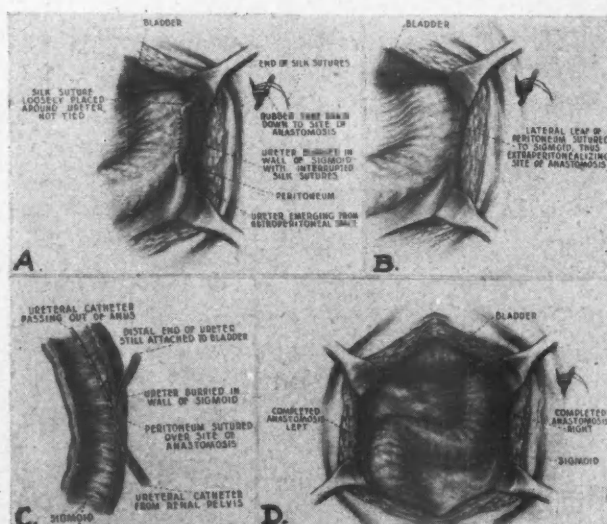


Fig. 3

Figs. 2 and 3.—Illustrating steps in ureterointestinal anastomosis.



Fig. 5.—(A) Intravenous pyelogram, 11 days after transplantation. Note slight ureteral dilatation and slight hydronephrosis. (B) Intravenous pyelograms three months after transplantation. Dilatation has disappeared and function is excellent. (C and D) Tumour and bladder after removal.

wall was an infiltrating grade No. 3 tumour extending almost to the midline and down laterally to the region of the left ureteral orifice and covering an area about 5 cm. in diameter, rather flat, with a necrotic base, protruding somewhat into the bladder. By bimanual examination this tumour could be palpated and seemed to be about the size of a hen's egg. There was no evidence of infiltration outside the bladder. The tumour was thoroughly resected and 17.0 gm. removed, and the base thoroughly fulgurated. The pathological report was returned as transitional cell carcinoma. It stated there were numerous nests and clusters of malignant transitional epithelium invading muscular tissue. The neoplastic tissue was moderately well differentiated. There was considerable fibrosis with subacute inflammation. The patient returned to the hospital on January 7, 1946. There was more tumour growing around the bladder neck, especially anteriorly, involving the prostate. It was therefore decided to do a total cystectomy.

After the usual preparations, on January 11, 1946, bilateral ureterointestinal anastomosis by the technique described was done, and on January 23, a total cystectomy was performed.

Thus far, May 14, 1946, the patient is getting along splendidly.

Thus a new method of ureterointestinal anastomosis prior to total cystectomy is presented which is simple and in eight patients was associated with no deaths or severe urinary tract infection. The operation has the following advantages: (A) by the use of the "intact" ureter the blood supply to the region of the anastomosis is maintained; (B) by immediately creating an anastomosis around a ureteral catheter, the danger of ureteral obstruction due to surgical oedema or kinkings is avoided; and (C) since the anastomosis is completed in the first stage no second operation of great magnitude is necessary.

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"Taken as a whole, education seeks to do two things: first, help persons fulfill particular functions in life which it is in them to fulfill; and second, to fit them so far as it can for those common spheres which, as citizens and heirs of a joint culture, they will share with others."
—Harvard University Committee Report.

THE IMPORTANCE OF BLOOD CHANGES IN CORONARY OCCLUSION*

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THIS investigation attempts to evaluate the importance of changes in the blood and circulation in coronary occlusion. The paper deals mainly with problems arising out of the various methods employed in the determination of these changes and their modification by dicoumarol therapy. The number of patients studied as yet is too small to be statistically significant but it is felt that the difficulties which have been encountered will benefit others embarking on similar investigations.

All patients suffering from coronary occlusion admitted to the wards of the Montreal General Hospital between January 28, 1946 and September 26, 1946, were investigated. Alternate cases were given dicoumarol. In many instances the investigation was incomplete due to lack of co-operation of the patient or early death.

The following procedures were used to determine possible changes in the blood or circulation. They were carried out shortly after the patient's admission to the hospital and weekly thereafter except in the case of blood volume determinations. The prothrombin time was done every second day on those patients who received dicoumarol, or more often, as found necessary to control the dosage.

THE WAUGH-RUDDICK TEST

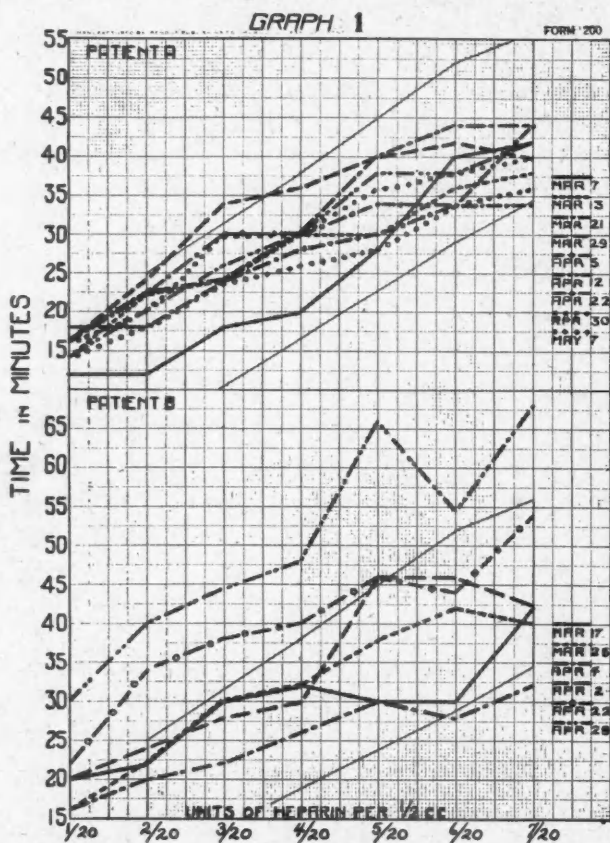
This test was devised by Waugh and Ruddick^{1, 2} to determine changes in coagulability of the blood not demonstrable by such tests as the coagulation time of Lee and White. The test measures the anticoagulant effect of serial dilutions of heparin on blood *in vitro*.

The test was found to be too time-consuming for our purpose when employed as described by Waugh and Ruddick. In many instances constant observations over several hours were necessary in order to complete the test. For this reason it was found desirable to use higher serial dilutions of heparin. Seven dilutions were used, beginning at 0.05 up to 0.35 units of heparin per half cubic centimetre of blood. By

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this means the time of carrying out the test was reduced on the average to about one-half to three-quarters of an hour.

Despite the utmost care in technique irregular curves were obtained in 26 of 62 tests. In general this was more noticeable in the more concentrated solutions of heparin, as is well illustrated in Graph 1 (Patient B). In this



The continuous light line represents the limits of normal, as described by Waugh and Ruddick.

graph six weekly Waugh-Ruddick curves on one patient have been plotted. It may be seen that the curves are grossly irregular in the right half of the graph (higher concentrations of heparin). This variability is also noted in some of the curves published by Waugh and Ruddick.²

In Graph 1 (Patient A) nine weekly Waugh-Ruddick curves done on one patient are represented. It will be seen that the curves of Patient A vary up and down from week to week in no predictable manner but tend to remain within the limits of normal.

Interpretation.—In their two published reports Waugh and Ruddick found that the blood of the majority of patients confined to bed for any reason exhibited a gradually increasing tendency to clot, with a gradual return towards the normal when such patients were once more

up and about. Such a test might prove of value in sorting out those individuals likely to develop further thrombotic, and later embolic complications, and perhaps throw some light upon factors concerned in the development of coronary occlusion. In our series of 15 cases, 7 exhibited a normal response on admission, 7 showed a tendency to clot and one patient revealed an actual decreased clotting tendency as shown in Table I. In addition, only 2 of the 15 cases showed a subsequent fall in the curve after being confined to bed.

TABLE I.
FIFTEEN CASES OF CORONARY OCCLUSION
VALUES OF WAUGH-RUDDICK CURVES ON ADMISSION

	Controls	Treated cases
Number of cases.....	9	6
Number low on admission.....	5	2
Number normal on admission.....	4	3
Number high on admission.....	0	1

Judged on the basis of the Waugh-Ruddick test, slightly less than half the patients suffering from coronary occlusion show a clotting tendency at the time of admission.

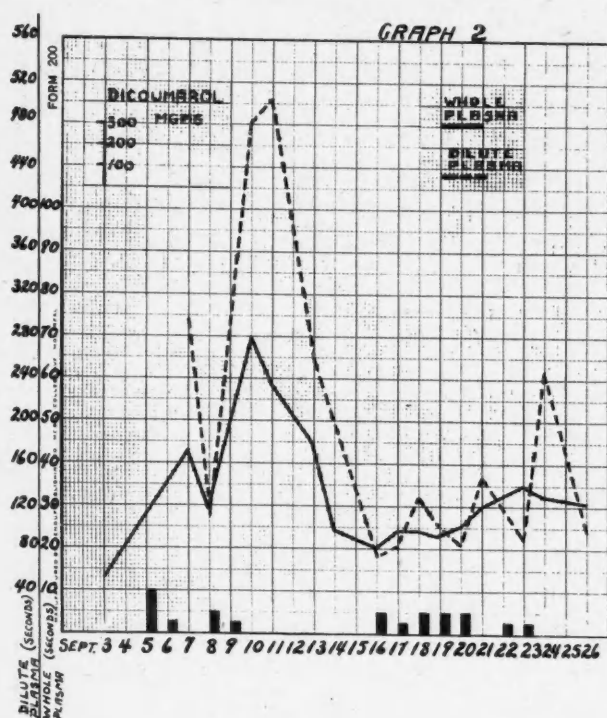
The above findings are at variance with those of Ogura³ who found that the Waugh-Ruddick test showed an accelerated clotting time by the 2nd or 3rd day of disease in slightly over 77% of a series of 27 coronary thrombosis cases.

In view of the above findings and because of the many variables in the actual technique of the Waugh-Ruddick test this procedure has not been found to be of value in the assessment and prognosis of cases of coronary occlusion.

THE PROTHROMBIN TIME

For determining the prothrombin time Quick's⁴ method was employed, using thromboplastin prepared weekly from rabbit's brain. In many instances prothrombin times on undiluted plasma were compared with those obtained after a 1:8 dilution with normal saline. Normals on undiluted plasma are 15 to 22 seconds—on the 12½% dilution from 60 to 80 seconds. Prothrombin times on diluted plasma were found to be unreliable, particularly when prolonged after dicoumarol therapy. For instance, the prothrombin time on one occasion was 38 seconds on each of two patients. When these samples were diluted 1:8 the prothrombin time on one was 400 seconds and on the other 1,100 seconds. This is an exaggerated example of a variability which renders the use of diluted

plasma undesirable for this test, especially when the prothrombin time is prolonged. Other instances of this marked variability are illustrated graphically in Graph 2.



This graph depicts the prothrombin times of a patient hospitalized for acute coronary occlusion and treated with dicoumarol. The solid line represents the whole plasma prothrombin time and the interrupted line the prothrombin time when 12½% plasma was used. It will be noted that the interrupted line tends to swing while the solid line follows a regular course. In several places the dilute plasma prothrombin time is falling while that of the whole plasma is rising and vice versa. Hence there does not appear to be a constant correlation between the prothrombin times done by the two methods. It will also be readily appreciated that such swings of the dilute plasma prothrombin time as shown here make it an unsuitable guide for the regulation of dicoumarol dosage.

Interpretation of tests.—It is of interest that only 2 of 15 patients with acute coronary occlusion showed prothrombin times below the normal at the time of admission to the hospital though it may be significant that it was at the lower limit of normal in an additional 11 cases (Table II). These findings are in agreement with those of Cotlove and Vorzimer⁵ and of Wright⁶ but at variance with those of Peters.⁷

COAGULATION TIME

The coagulation time was measured by the method of Lee and White using three tubes as described in their original report. Judging from the values obtained, in comparison with prothrombin times done at the same time on the same patient it would seem desirable to extend the upper limits of the normal values to 15 minutes (Table II). This would conform more closely with other standards of normalcy.

TABLE II.
PROTHROMBIN TIME AND COAGULATION TIME ON
ADMISSION

Case No.	Prothrombin time in seconds		Coagulation time (in minutes)
	Diluted	Undiluted	
1.....		15	10
2.....	67.5	16.25	13
3.....		17	12
4.....	230	30	13
5.....		17	10
6.....	74	15	9
7.....	72	15	16
8.....		13.5	11.5
9.....		15	14
10.....		16	15
11.....	66	13.5	15
12.....		17	11
13.....		17	12
14.....	191	20.5	18
15.....	61	15	13

Interpretation of results.—Coagulation times on admission varied from 9 to 18 minutes, and were equally distributed throughout the normal range. In the untreated series, there was no constant variation of the coagulation time during hospitalization.

CIRCULATION TIME

The intravenous decholin arm to tongue test was used. The normal range for bed patients was found to be from 15 to 20 seconds. Inasmuch as the end point in this test is a subjective one, it varies somewhat with the intelligence and co-operation of the patient. Occasionally, very ill patients cannot co-operate satisfactorily, rendering the test valueless.

Interpretation.—Table III shows that 8 of 15 patients suffering from coronary occlusion had a normal circulation time when admitted to the hospital. The remaining patients showed a prolonged circulation time of from 27 to 32 seconds. Four of these subsequently became normal, one remained unchanged, one patient had one estimation only before death, and one patient showed an increasing circulation time during the 2 weeks of hospitalization. It should be noted

TABLE III.
CIRCULATION TIMES (in seconds)

Case No.	Value on admission	Subsequent behaviour	Clinical shock on admission	Clinical course
1	19	Unchanged	No	Recovered
2	20	One determination only	No	Left hospital against advice
3	15	Unchanged	No	Recovered
4	27	Increased (to 47 sec.)	Yes (mild)	Recovered
5	27.5	Decreased (to 16 sec.)	No	Recovered
6	32	Decreased (to 14 sec.)	No	Recovered
7	17	Unchanged	No	Recovered
8	18	Unchanged	No	Recovered
9	21	Decreased (to 16 sec.)	Yes (mild)	Recovered
10	16	Unchanged	No	Recovered
11	28	Unchanged	No	Recovered
12	No response	Second test 29 sec. decreased (to 20 sec.)	Yes	Recovered
13	30	Decreased (to 22 sec.)	No	Recovered
14	28	One determination only	Yes	Died
15	19	One determination only	No	Died

that three of the four cases showing clinical shock at the time of admission had a slowing of the circulation time; that clinical shock was not present in the remaining 4 patients whose circulation times were below normal on admission, and that one of the two patients who subsequently died had a normal circulation time.

BLOOD VOLUME

Blood volumes were determined by the Evans Blue method using a photoelectric colorimeter.^{8, 9} Twenty-five milligrams of the dye were injected intravenously into one arm and the blood sample withdrawn from the other 15 minutes later. Undyed plasma from the patient was used for colorimetric comparison. It was found that if the test was repeated weekly, as first intended, pigmentation of the skin frequently appeared and remained for weeks, which constituted a serious objection to the test. Hence blood volume was determined only on admission and on discharge.

Interpretation of results.—No significant changes were noted in 5 patients tested. In four patients on whom the test was repeated during convalescence, the results were equivocal. Two showed higher values at the time of admission than at discharge, one showed no change, and one had a higher blood volume on discharge than on admission.

HÆMATOCRIT VALUES

The plasma-red cell ratio was determined by means of a Wintrobe Hæmatocrit, centrifuging at 2,800 r.p.m. for 30 minutes.

Interpretation of results.—Four of the 15 patients revealed significant hæmoconcentration at the time of admission, while two others showed a relative hæmoconcentration as compared with their hæmatocrit readings at the time of discharge. These six cases are shown in Table IV. Eight of the remaining patients had normal values throughout hospitalization. One who also suffered from polycythæmia vera showed no significant change during his illness.

TABLE IV.
CASES SHOWING FALL IN HÆMATOCRIT VALUE OF 4% OR OVER FROM ADMISSION LEVEL

Case No.	Admission value	Lowest value during hospitalization
	%	%
1.....	50.0	44.0
5.....	56.5	51.5
7.....	52.5	45.5
11.....	47.5	43.5
10.....	58.0	53.0
8.....	38.5	32.5

HYPOPROTEINÆMIA

The plasma proteins were determined by the copper sulphate method which was found to compare well with the Kjeldahl procedure.¹⁰

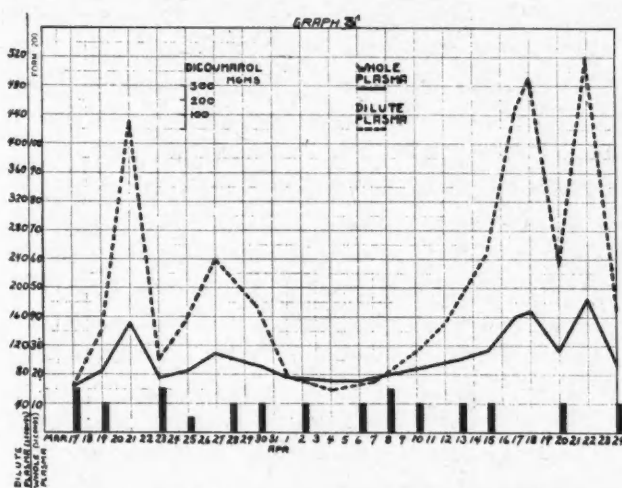
Interpretation.—The plasma proteins were within normal limits in all patients, thus excluding hypoproteinæmia as a significant factor in this series.

DICOUMAROL

Dosage.—The dosage of dicoumarol used in this series followed the plan recommended by the Mayo Clinic Group.¹⁶ An initial dose of 300 mgm. was given and the prothrombin time determined 48 hours later. Subsequent dosage was governed entirely by the level of the prothrombin time, 40 seconds being considered the optimum level. Single doses of from 100 to 200 mgm. of the drug were administered whenever the prothrombin time fell to the 35 second level. Theoretically such a rule avoids overdosage and maintains an optimum therapeutic level as long as desired. In actual practice a number of difficulties are encountered and it is a discussion of these which prompts this report.

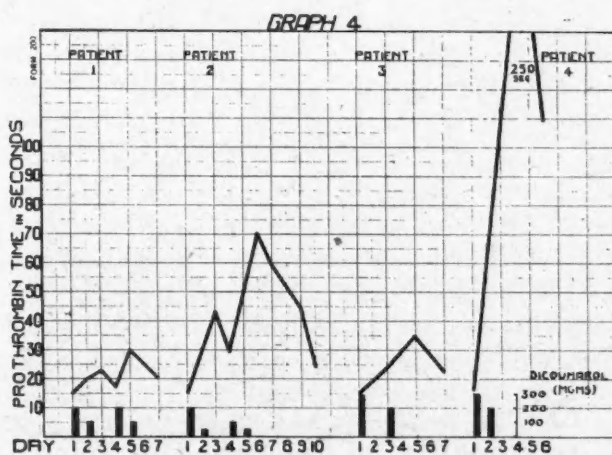
One of the greatest difficulties in dicoumarol administration is the determination of indi-

vidual susceptibility to the drug. The standard dosage may provoke a satisfactory rise in the prothrombin time in one patient while in the next the same dosage causes no change whatsoever. These difficulties have been encountered by others.^{11, 12, 13, 15} To add to these difficulties, these same refractory patients may later exhibit satisfactory response on a smaller dosage of the drug. Some of the variables are illustrated in Graphs 3 and 4. Graph 3 illustrates the initial satisfactory response, the subsequent failure of the drug and finally a good response to a smaller dosage.¹⁴



Graph 4 illustrates the individual variability of response. Reference to this graph will show that all four patients exhibited different responses to essentially the same total dosage of drug. Two might be considered within desirable therapeutic limits, whereas one is certainly greatly in excess of the limits of safety.

Toxic effect of dicoumarol.—Only one patient showed an apparent toxic effect. This patient developed nausea and eventually vomiting within a half hour after each administration



of the drug. Various attempts to disguise the drug in food, drink or medication were unsuccessful and the drug had to be discontinued.

Effect of dicoumarol on coronary occlusion.—As already stated, conclusions as to the effect of dicoumarol on the complications of coronary occlusion are not warranted in such a small series of cases. It may or may not be significant that none of the patients who received the drug developed thrombotic or embolic complications. This was also true of the controls.

SUMMARY AND CONCLUSIONS

1. No constant changes in the blood have been noted in patients suffering from coronary occlusion, as measured by the Waugh-Ruddick test, circulation time, the coagulation time, the prothrombin time and the blood volume.

2. The individual variation in the effects of dicoumarol on the prothrombin time is too great to permit of a standard dosage for all patients. The dosage in any given patient must be determined by the results of the initial test administration and the subsequent response.

Toxic effects such as nausea and vomiting are rare.

The authors wish to express their thanks to Messrs. Ayerst, McKenna and Harrison for assistance in this investigation.

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ECTOPIC PREGNANCY AS A DIAGNOSTIC PROBLEM (A study of 100 cases)

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OF all pathological conditions arising in the female pelvis ectopic pregnancy is probably the most commonly misdiagnosed. This has certainly been my own experience and, if the pre-entry diagnosis on patients entering my service at the Victoria General Hospital is any criterion, it is the experience of others also. Because of this I thought it might be worth while to go back over 100 consecutive cases of the disease in an attempt to discover some diagnostic principles that might make error less likely.

To begin with, let us glance briefly at the clinical picture presented. There are really two clinical pictures, which differ considerably from one another. In one, the symptoms and signs are the result of the rapid loss of a fairly large quantity of blood into the peritoneal cavity—acute ectopic: in the other the loss is smaller and much slower—chronic ectopic. Since most textbooks fail to distinguish clearly between these two pictures they confuse the searcher after truth, so that the average student comes to think of ectopic pregnancy as a condition that should be associated with amenorrhœa and signs of a considerable internal blood loss, whereas amenorrhœa is present in only about the half of all cases, and signs of large internal blood loss in slightly over a third. Furthermore, it is in the larger group where the internal blood loss is slight that the greatest diagnostic difficulty arises.

The acute ectopic pregnancy picture.—Here is a woman in the child-bearing age with the signs and symptoms of a serious internal hæmorrhage. With or without having missed a menstrual period, she is stricken with severe pain in either iliac region, or in the hypogastric region. Usually she faints or feels like fainting, and often she vomits once or twice. Bleeding *per vaginam* is usually present, but may be absent. The temperature may be raised, but in half the cases will be normal or subnormal. She will be tender and resistant over most of the abdomen but particularly over the area of greatest pain. She will be tender bimanually on moving the cervix, and if a definite tender

mass is not felt in one of the fornices she will be tender there, sometimes exquisitely so. If there is some clotting of blood in the pouch of Douglas it will be felt as a rather vague, doughy swelling. The pulse will be rapid and keep getting more so. The woman grows paler and paler with a low hæmoglobin index and red cell count. While there may be no leucocytosis, in some cases it rises as high as 35,000. Finally, the woman begins to grow restless from blood loss and very soon the situation deteriorates seriously with increasing restlessness, pallor, shallow and sighing respirations and unless something is rapidly done about it—death.

The above picture develops within a few hours of the onset of the symptoms, and cases have been known to bleed to death in less than an hour. One of our cases whose symptoms had lasted slightly over two hours, died shortly after admission, before she could be given blood.

Let us develop this picture in more detail, with special reference to any light thrown upon it by the study of the 100 cases under consideration.

Pain.—This is the most constant symptom and was present unmistakably in every case of acute ectopic, of which there were 33. In all 33 cases it could be called severe. While there was no constant character to the pain, it usually began as a sort of colic, became sharp and cutting,—sometimes agonizingly so—and then settled down to a rather severe ache. Usually felt in one or other of the iliac regions, in about a third of the cases it was most marked in the hypogastric region. In two cases the greatest pain was felt in the right hypochondriac region, one of which was sent into hospital with a diagnosis of biliary colic. One case felt her maximum pain in the rectum. (Since making this study I have encountered another case in which the pain was rectal.)

The important points about the pain in acute ectopic are then: (1) that it is always severe; (2) that it does not need to be iliac in location; (3) that it is always present.

Abdominal examination.—Tenderness is a constant finding, usually most marked over the area of maximum pain. Rebound pain is sometimes present, sometimes absent. There is usually some resistance over the entire abdomen, greatest over the area of greatest tenderness, but in none of our cases was it a board-like rigidity. In 7 of the 33 cases this resistance was present

only over the area of greatest pain. Nothing was found at operation to account for this variability in resistance, which did not appear to depend either on the amount of blood lost internally or on the amount of tubal damage present. In 5 cases the effused blood gave the abdomen a doughy feel, but this was present only in those cases which had no generalized resistance. In all 17 cases in which the abdomen was percussed evidence of movable dullness was obtained. Cullen's sign—a bluish discoloration of the skin near the umbilicus—was not present in any case, and I have only seen it once in my life. Occasionally a mass will be felt rising out of the pelvis, but in this series it was present only in cases of secondary abdominal pregnancy, and in not all of those (3 out of 6).

The important points in the abdominal examination are: (1) There is always tenderness and usually resistance; (2) percussion will practically always reveal movable dullness; (3) a mass is very seldom found and if found suggests a secondary abdominal pregnancy.

Vaginal bleeding.—This is absent in a surprisingly high number of the acute cases, 9 out of 33. It is usually moderate in amount and about the equivalent of a menstrual period in three-quarters of the cases. Occasionally it is just a brownish stain—two cases. In two other cases it was severe enough to suggest a miscarriage. A complete decidual cast was passed in only one case: and in only one other were there fragments large enough to be noted.

The important points about the vaginal bleeding are: (1) it may not be present; (2) it is variable in amount and colour; (3) it may only be a brownish stain that the patient has failed to notice.

Vaginal examination.—Tenderness on pressure in the vaginal fornix on the side affected was present in all cases. Tenderness on moving the cervix was present in 25 of 33 cases. A pelvic swelling or mass was palpable in slightly over half the cases (18 out of 33). Clotting of blood sufficient to cause a doughy mass in the pouch of Douglas was present in 5 cases. Most textbooks speak of enlargement of the uterus in ectopic pregnancy as though it were a useful sign: we could detect it in only 9 cases and in my opinion it is a poor sign. In 5 cases in which the patient did not know she was bleeding or staining *per vaginam* we discovered it while doing the vaginal examination.

Important points arising out of the vaginal

examination: (1) there is always tenderness on pressure in one of the vaginal fornices; (2) there is usually tenderness on moving the cervix; (3) failure to feel a tubal mass does not rule out the condition; (4) do not take the patient's word that she has no vaginal bleeding—look and see.

Temperature.—In 23 of the 33 acute cases the temperature was normal or subnormal, the lowest 95° F. In the 10 cases in which it was raised the highest was 101.6° F. I thought that there might be some connection between the temperature and the amount of and rapidity of the internal blood loss: was the large percentage of normal and subnormal temperatures due either; (1) to a large blood loss; or (2) to the short time elapsing between blood loss and admission to hospital? Our series seems to show that there is no such connection. One case operated upon 3 hours after onset of symptoms had a large internal blood loss—over 1,200 c.c.—and a temperature of 100.6°. Another case operated on 17 hours after the onset of symptoms had an internal blood loss of only 500 c.c., and a temperature of 96°.

Important points arising out of temperature: (1) a normal or subnormal temperature is much more common in acute than in chronic ectopic; (2) a subnormal temperature is a useful confirmatory sign in a woman with severe low abdominal pain and signs of internal hæmorrhage, since acute ectopic is the only critical low abdominal condition likely to be associated with a subnormal temperature.

Leucocyte count.—In only two cases was the white cell count below 10,000—lowest 5,400. In all others it was raised—highest 35,000. We hoped here to find that the time element would play some part in the production of a leucocytosis, and that the longer the symptoms had lasted the more likelihood there was of a high leucocyte count, and vice versa. There was no evidence in our series to support such a contention: nor did the amount of internal blood loss seem to play any part.

Important points arising out of the leucocyte count: (1) a raised leucocyte count is a useful diagnostic aid; (2) acute ectopic can exist with a leucopenia.

Hæmoglobin index and red cell count.—These are invariably lowered in acute ectopic. In the two cases in which the Hb. index was 70, more than 600 c.c. of blood in one case and 900 c.c. in the other were mopped up from the

abdominal cavity. On the other hand in one case that had a Hb. index of only 36 there was the remarkably small internal blood loss of 300 c.c. The red cell count more or less followed the Hb. index. The important point arising out of the Hb. index and red blood count was that they are almost invariably low, but are not necessarily a perfect indication of the amount of internal blood loss.

Amenorrhœa.—In slightly more than half of the cases there was no history of amenorrhœa, and this symptom is no more common in acute than in chronic ectopic. The longest period of amenorrhœa in our series was 118 days—a case of secondary abdominal pregnancy. The shortest was 15 days, which may seem fantastic, but so far as I could learn from a careful questioning of this patient the period that occurred 15 days before the onset of her symptoms was a perfectly normal one. In this particular case the pregnancy was a very early one, in the interstitial portion of the tube—and do not some women seem to be able to get pregnant at any time in their menstrual cycle? But what is more, we had 9 of our total of 100 cases of ectopic in which the symptoms came on *less* than 28 days following the last period in women whose cycle was approximately 28 days in length. I do not believe that the textbooks stress sufficiently the fact that amenorrhœa is a relatively unimportant symptom, for it almost invariably happens that when I ask a final year medical student in his orals for the symptoms of ectopic, he mentions amenorrhœa first—and these my own students, too!

The important diagnostic fact arising out of amenorrhœa is that, since it is present in less than half the cases, its absence should not turn one away from a diagnosis of acute ectopic.

CHRONIC ECTOPIC PREGNANCY

Sixty-seven of my 100 cases were of this clinical variety, and it was here that the greatest difficulty in diagnosis was encountered and the most mistakes made. This is the sort of picture that presents itself: a woman, with or without a history of amenorrhœa, gets pain or soreness in one or the other iliac fossæ or in the hypogastric region. With the onset of pain or soreness she begins to bleed or to stain *per vaginam*. Sometimes the pain comes first, sometimes the bleeding, but they are never far apart. She may feel weak or faint—51 of 67 did so. On examination she is tender over that

part of the abdomen where she feels pain, but there is often very little abdominal rigidity. Bimanually a small tubo-ovarian mass is usually felt on one side of the pelvis, but may not be. The temperature is slightly raised: there is usually leucocytosis. The patient may have been up and around carrying on with her work for days, or even weeks, before sending for her doctor, and may have been treated by him for some time before a diagnosis was made. Nine women who at first presented the picture of chronic ectopic later became acute.

Let us now examine this picture in detail.

Pain.—Usually this is severe enough to send the patient to her doctor, but it has not the dramatic savagery of the acute variety. Sometimes it is no more than a nagging, but all the cases save one in my series presented discomfort in the lower abdomen that varied from soreness to severe pain, and even the exception confessed after her operation that her right side "hadn't felt right" from the time her vaginal bleeding started. While usually felt in one or the other iliac region the pain may be located in the hypogastrium.

Important points about the pain: (1) it is always present, although in some cases it may amount only to a discomfort; (2) it is not necessarily iliac in location.

Abdominal examination.—Tenderness was invariably present, and was usually most marked where the pain was severest. It varied greatly in severity, in some cases the mere touch of the hand was more than the patient could bear, in other cases deep palpation was necessary to bring it out. Resistance was present in only 25% of the cases. When there is a large pelvic hæmatocele present, or an ovarian cyst, or a secondary abdominal pregnancy, a tumour may be felt in the abdomen, but this was the case in only 7 of the 67 chronic cases.

Important points in the abdominal examination: (1) tenderness is always present in the low abdomen; (2) deep palpation may be required in some cases to elicit it; (3) if a tumour can be felt it is probably a secondary abdominal pregnancy, some accompanying pelvic tumour, or a pelvic hæmatocele.

Vaginal bleeding.—This is rarely absent—in only 3 out of 67 cases. It varies considerably in character and amount. In some cases it was excessive enough to suggest a miscarriage, in others it was merely a brownish stain so slight in amount that in 10 of the 67 cases the pa-

tient did not know she had it. Once it starts it is usually present continuously and in one of our cases had been so present for 59 days. Occasionally it was interrupted for anything from a day to two weeks. The patient may regard the first such spell of bleeding as a menstrual period.

Important points about the vaginal bleeding: (1) it is almost always present; (2) it may only be a brownish stain of which the patient is ignorant and which you will discover only when you do the vaginal examination; (3) since in half the cases the vaginal bleeding comes on at about the time the menstrual period is due, the patient will often misinterpret it to you as a period, either normal or abnormal.

Vaginal examination.—The bleeding or brownish discharge will be noted. The cervix is usually tender when moved, but there is always tenderness on pressure in the fornix on the affected side. A tubo-ovarian mass was felt in 51 of 67 cases: was not felt in the others. Hæmatocele formation often creates diagnostic difficulty, since it may feel like a fibroid, or an ovarian tumour, or a pyosalpinx, and in our series three fairly large hæmatoceles were so misdiagnosed. In only 7 of the 67 cases could any definite uterine enlargement be made out.

Important points in the vaginal examination: (1) very slight bleeding or brownish discharge of which the patient is unaware may be discovered by the vaginal examination; (2) inability to feel a tubo-ovarian mass does not rule out chronic ectopic; (3) there is always tenderness on pressure in the fornix on the affected side.

Temperature.—This was almost always raised; it was normal in only 6 of 67 cases. In only one case was the temperature below 98°, and in this case it was 97.4°. The subnormal temperatures which are fairly common in acute ectopic are not present in chronic ectopic. The temperature is usually around 100, but the highest in our series was 103°.

Important points about the temperature: (1) it is almost always above normal, and practically never subnormal; (2) a temperature as high as 103° does not rule out ectopic.

Leucocyte count.—In only 13 of the 67 cases was it below 10,000. It does not go as high as in the acute condition. In our series the highest was 24,000, and averages around 12,000.

Important point arising out of the leucocyte count: it is usually raised and in most of the

cases which I diagnosed ectopic and found something else it was not raised: I therefore always hesitate in diagnosing chronic ectopic when the leucocyte count is normal.

Hæmoglobin index and red cell count.—The hæmoglobin index was usually above 60, although in one case it was as low as 30. In 31 of the chronic cases, almost half, it was 70 or above, the highest being 85. Generally speaking the red cell count followed the hæmoglobin index.

Important point arising out of the Hb. index and red blood count: chronic ectopic can be present with very little evidence of anæmia, and this is so in almost half the cases.

Amenorrhœa.—As in acute ectopic this symptom was absent in about half the cases. A history of amenorrhœa is not necessary for the diagnosis of chronic ectopic.

So much for the two clinical pictures presented in ectopic pregnancy. There are now certain diagnostic methods that should be mentioned.

Examination under anæsthetic.—By this method the presence of a tubo-ovarian mass can be established in practically every case, whether of the acute or chronic variety. It is therefore of great value in doubtful cases, especially when acute. Occasionally, however, a mass will not be felt under the anæsthetic. This happened in 5 of our cases and was due either to, (1) the escape of the mole from the tube or, (2) a very early case in which the tubal enlargement was too slight to be palpated even with complete abdominal muscle relaxation.

Needling the pouch of Douglas.—A long needle attached to a 20 c.c. syringe is pushed up into the pouch of Douglas from the vagina in an attempt to obtain free blood. This was done in 20 of our cases, and in only one did we fail to obtain any blood at all, although there were 9 cases in which the amount of blood obtained was less than one c.c. The test was therefore of unquestioned value in only half the cases in which we tried it.

Biological tests.—The Friedman and Zondek-Ascheim tests will be positive as long as there are actively functioning chorionic villi, but as this is likely to be the case only where the pregnancy is continuing as a secondary abdominal it has slight practical value. We did not use the tests in any of our 100 cases, but in a recent case of secondary abdominal pregnancy in which I wished to try it they had no rabbits of the right vintage in the laboratory

Dilatation and curettage.—This is done to obtain decidua which, if present without chorionic villi, would point to ectopic. We did not use this test intentionally in any of our series, for the following reasons: (1) if the vaginal bleeding has lasted for more than 10 days in any quantity all of the uterine decidua will be shed, and in most of our chronic cases the bleeding had been present for at least that length of time. (2) In acute ectopic there is no time for such delaying measures.

Hysterosalpingography.—Injection of the uterus and tubes with iodized oil, followed by the taking of an x-ray picture, may show up an ectopic very clearly. We did not use this method in any of our cases.

Important points arising out of the above five diagnostic methods: (1) only the first two, examination under the anæsthetic and needling of the pouch of Douglas, appeared to us to be of practical value, and of these two the first was the most useful; (2) needling of the pouch of Douglas is likely to obtain blood only in those cases in which there is a fair amount of free blood in the pouch, it is therefore not likely to be of much value in patients who show by their slight degree of anæmia that they have little internal bleeding, in other words the cases in which diagnosis is most difficult; (3) the Zondek-Ascheim test is likely to be of value only where there is a continuing secondary abdominal pregnancy.

There are other factors that enter the diagnostic field, not so much as aids but as red herrings.

History of previous pelvic inflammatory disease.—Although evidence of previous pelvic inflammation was present in 25 of our 100 cases, a history of this condition was obtained in only 13. While such a history may point up the etiology, I have not found it of any value in arriving at a correct diagnosis. Indeed, the reverse was the case, since one was more apt to think of a fresh attack of inflammation than of ectopic pregnancy.

History of sterility.—Previous sterility or relative sterility is said to be present in a large percentage of women who develop ectopic pregnancies. Our findings seemed to confirm this. In 20 of the 100 cases there had been no previous pregnancy: in 26 there had been none for three years or more: and in 21 the last pregnancy ended in a miscarriage. However, since we have no knowledge in any of our series of

the use of contraceptives, not much stock can be placed in these figures.

Presence of accompanying disease.—Apart from the evidence of previous pelvic inflammation, other pelvic conditions complicated the picture in 12 cases. One of these had had a genuine miscarriage 24 days previously: in 7 there were follicular cysts of the ovary of the same side varying from size of a hen's egg to that of an orange: in 2 there was such a cyst on the opposite side: in 2 cases there were small subserous fibroids.

History of a previous ectopic.—In all 7 cases where this story was obtained the diagnosis was made quickly and correctly, the patient making it herself in 3.

Of the above four factors only the last appeared to us as being of any positive value in arriving at a correct diagnosis: all of the first three, on the other hand, tended to make a diagnosis of ectopic either less likely, or less easy to arrive at.

How well did we do diagnostically in our 100 cases? I have unfortunately no record of the number of times we diagnosed ectopic and found something else, since our system of record-filing does not lend itself to that information, but there must have been at least a dozen of such cases. In the 100 cases under consideration our final preoperative diagnosis—after examination under the anæsthetic and needling of the pouch of Douglas—was as follows:

Ectopic pregnancy	88
Chronic pelvic inflammation	5
Pelvic abscess	2
Acute appendicitis	2
Benign uterine bleeding (metropathia) ...	1

Of the 12 cases in which a mistaken diagnosis was made only 2 were of the acute variety, diagnosed as follows:

1. Ovarian cyst with a twisted pedicle. There was a definite cystic tumour present in the pelvis on the right side. The patient said she had been menstruating right along but on questioning after the operation stated that the periods had been irregular and painful. We had ectopic in mind for we needled the pouch of Douglas, but as we obtained a clear straw-coloured fluid, we made the diagnosis of a cyst. This case turned out to be a secondary abdominal pregnancy and our needle had entered the amniotic sac.

2. *Acute appendicitis.*—There was no vaginal bleeding, the pain was in the neighborhood of the umbilicus, but she was sore and resistant in the right iliac region. There was more vomiting than is usual with an ectopic. No mass could be felt *per vaginam* and while she was tender in the right fornix, this tenderness was not as marked as that in the neighbourhood of McBurney's point. No period had been missed. Needling of the pouch of Douglas was not done since the possibility of ectopic was not entertained.

Of the 10 chronic cases 5 were thought to be chronic pelvic inflammation. In 3 there was a history of a previous attack of inflammation. In one there was no vaginal bleeding. In one the pouch of Douglas was needled but no blood obtained. Nevertheless, in reading over the histories of all these 5 cases after operation, we felt that ectopic pregnancy should have been diagnosed and that we had made our mistakes by following red herrings in the histories. For the other five cases we found excuses for ourselves. We diagnosed these as below:

1. *Acute appendicitis*.—No vaginal bleeding. Symptoms came on before the period was due. Pain of a crampy nature centred just below the umbilicus; unusual amount of vomiting; tenderness and resistance in McBurney's region. Hb. 80, red blood cells 4,300,000, white blood cells 13,000.

2. *Pelvic abscess*.—Temperature 103°. Nightly chills. Vaginal bleeding present for 10 days, but it was thought to be a normal period dragged out. White blood cells 18,000, Hb. 75. Abdominal tumour and large swelling in pouch of Douglas. The pouch was needled and some brownish-gray pus obtained. It was only when an incision was made along the course of the needle that the large collection of old blood began to pour out, disclosing the true diagnosis. This was an infected hæmatoma in a single girl who had a previous history of acute pelvic inflammation.

3. *Ovarian cyst with twisted pedicle*.—The cyst could be felt clearly and was about the size of an orange. It was very tender in one part on *per vaginam* examination; Hb. 80, white blood cells 7,500. Pain in side came on with vaginal bleeding at the time her period was due, and the vaginal bleeding which had lasted 3 days was like that of a normal period. Under the anæsthetic the cystic swelling was so clearcut that ectopic was not considered. This patient had a follicular cyst the size of an orange and on the same side an early ectopic in the tube.

4. *Chronic pelvic abscess*.—This patient had been on our service previously with a choked pelvis in an acute attack of pelvic inflammation. She had had in the meantime several attacks of pain similar to the present one. She was bleeding but declared it was a normal period; Hb. 75, red blood cells 4,200,000. Irregular pelvic masses on both sides of the pelvis could be felt *per vaginam*, much more tender on the right than on the left. On opening the abdomen we found a mass of chronic pelvic inflammation on the left side, and on the right the tube with the mole still in it.

5. *Benign uterine bleeding*.—This was the one case in our series that had practically no abdominal pain or discomfort, and so little vaginal tenderness that we disregarded it. She told us later that she did have some slight distress in the bladder region but had had it also with her last two normal periods. Her story was—she was a woman of 42—that following two weeks amenorrhœa she began to dribble blood and had been dribbling steadily for about 3 weeks; Hb. 75, white blood cells 5,900. The picture looked so much like metropathia and so little like ectopic that we decided, in view of her age, to do a vaginal hysterectomy. It was when we opened the pouch of Douglas and found free blood and the old clot that we realized our mistake.

I do not believe that, faced tomorrow with any of the above five cases, I would do any better diagnostically. It is interesting to note, however, that while there were 10 mistaken diagnoses in 67 chronic cases there were only 2 in 33 acute.

CONCLUSIONS

What conclusions, apart from those already listed, can be drawn from the foregoing?

1. Given a woman of the childbearing age with severe low abdominal pain, a tender vaginal fornix and signs of internal hæmorrhage, the diagnosis is likely to be acute ectopic even if there be no amenorrhœa, no vaginal bleeding, no leucocytosis, no temperature and no palpable mass.

2. Given a woman in the same age period with low abdominal pain or soreness, a tender vaginal fornix however slightly so, and irregular vaginal bleeding or brownish discharge, the diagnosis is likely to be chronic ectopic even if there be no amenorrhœa, no anæmia, no leucocytosis, no temperature, no palpable mass, or no blood obtained on needling the pouch of Douglas.

3. When in doubt examine the patient under the anæsthetic and needle the pouch of Douglas.

4. Unless you have the gift of working miracles you will inevitably make some mistakes in diagnosing ectopic pregnancy.

SUDDEN DEATH*

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DEATH ordinarily comes as the termination of an illness of longer or shorter duration, in which case the clinician has, or should have some knowledge of the lesion concerned and of the organ involved. But, in many cases, death is either instantaneous, or follows an illness of relatively short duration, in an individual whose previous health was apparently good.

These cases are tragic for friends and relatives and are often puzzling to the physician who may be called, and who often lacks knowledge of the clinical history of the case. In the absence of an autopsy, the signing of a death certificate presents no little difficulty, for, as yet, only a fraction of the number of cases of sudden or unexpected death come to autopsy. Accuracy in assigning the cause of death often assumes considerable importance. There is a medico-legal aspect to every case of sudden and unexpected death, and every pathologist of experience has had occasion to perform autopsies

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on bodies exhumed because of persistent rumours of foul play. Then, too, questions of accident insurance, and of pension and workmen's compensation often hinge on an accurate diagnosis of the lesion which causes the sudden or unexpected demise.

It is therefore of considerable importance that the physician should be reasonably familiar with the range of lesions and conditions which may be associated with sudden death, so that, when called upon to sign death certificates in such cases, he will, so far as clinical and statistical knowledge of the subject are concerned, be able to attain a creditable degree of accuracy in his diagnosis.

Sudden death, for the purposes of this discussion, includes instantaneous death, which occurs in a matter of seconds or minutes; unexpected death, which may be a matter of hours or days after the unexpected onset of the illness; and also cases "found dead", and those which "collapsed and died". Deaths from violence or from poisoning are excluded. To quote Brouardel,¹ "We will define sudden death as the rapid and unforeseen termination of an acute or chronic disease which has in most cases developed in a latent manner".

Any pathologist who has had a reasonably wide experience in the performance of autopsies in cases of sudden or unexpected deaths, will have observed the wide range of lesions concerned and of organs involved. All the systems of the body contribute. Lesions of brain, meninges, heart, arteries, veins, lungs, liver, spleen, pancreas, adrenals, kidneys and genitals are all seen in any series of autopsies of reasonable dimensions. Instantaneous death is almost always of cardiac origin, less commonly due to massive pulmonary embolism. Other cases of unexpected death, which occur in a matter of minutes or hours after the initial seizure, are more likely to be associated with cerebral or pulmonary lesions or with hæmorrhage.

Brouardel,¹ the French medico-legal authority of the latter part of the nineteenth century, said in a lecture to his students in 1897:

"Gentlemen, however carefully we may perform every autopsy, however minute our exploration of the body may be, however thorough may be our knowledge of the causes of sudden death, we sometimes meet with cases which it is impossible to explain. The proportion is about 8 or 10%."

Some others³ have reported similar percentages. But with the present day development of the technique of bacteriological, biochemical and

toxicological analysis, and with the improvement in histological technique and diagnosis, it would appear that the percentage of unsolved cases should, in the hands of competent pathologists with adequate laboratory facilities, be kept below 1%. There will always remain a few cases for which no solution can be found, so limited, as yet, is our knowledge of the vital processes and of the actual conditions which fatally interfere with them.

Any survey of the post mortem findings in a series of cases of sudden or unexpected deaths, stresses the important rôle assumed by lesions of the cardiovascular system. Hamman,⁸ studying the analyses of a number of reports in the literature, concluded that: (a) 91% of sudden deaths from natural causes are due to disease of the cardiovascular system: (b) 65% of all cases are due to sudden heart failure; (c) 21% to hæmorrhage; and (d) 5% to arterial embolism and thrombosis.

My own experience of the past 20 years, covering about 300 cases would bear this out. It is safe to say that 4 of 5 cases of sudden or unexpected death are related to lesions or disturbances of the cardiovascular system and that 1 of 5 must be ascribed to some other lesion or cause. Arterial disease, whether luetic or atherosclerotic, still remains the greatest threat to human longevity and the greatest factor in sudden and unexpected deaths. Stenosis, thrombosis and aneurysm of arteries resulting in ischæmia, infarction or hæmorrhage of vital organs, accounts for more than half of the cases of unexpected death.

The myocardium, with its neuromuscular mechanism, is probably the most sensitive and most complicated organ in the body, and is at the same time, the most essential in its function. A very few minutes' suspension of its activity, with the accompanying anoxæmia of cerebral centres, is fatal. So sensitive is its nervous regulatory mechanism, with its autonomic and vagal control, that many cases of sudden death are characterized by the absence of any anatomical or histological evidence of myocardial disease. Death may occur from syncope or from shock, and in these cases death may be considered to be but a fatal syncope. The shock may be the result of light blows upon such regions as the solar plexus, or kidney, or of increased sensitivity of the carotid-sinus reflexes, or even of intense emotional strain, all of which result in sudden

inhibition of heart action. Normally the inhibition passes off in time for recovery of function, and before ischæmia and anoxæmia of myocardium and cerebral centres have produced irreparable damage. In certain cases, however, there seems to be an increased sensitivity of vagal and sympathetic reflexes, and a hyperirritability of the myocardium and of its neuromuscular mechanism, and then the shock ends fatally. In these cases, no pathological lesion can be demonstrated. The following two cases illustrate this type of sudden death.

(a) An abortion was attempted in a girl of 19 years, by the introduction of a solution of lysol into the uterus, using a Higginson syringe. With the introduction of the nozzle into the cervix, the girl gave a scream and collapsed, and died within a matter of a few minutes, the result of the shock caused by the too forcible dilatation of the cervix.

(b) A girl, 19 years of age, while undergoing a laparotomy for the removal of the gall bladder, in the midst of the operation collapsed on the table and the heart ceased to beat. Manual massage of the heart through the incision reestablished the heart action after about 12 minutes. Consciousness however did not return and she died about 15 hours later. Her myocardium recovered from the anoxæmia but her cerebral centres did not.

Most cases of sudden or unexpected death, in which inhibition of cardiac activity is the basic factor, show various pathological lesions of the myocardium which often are not suspected during life. These lesions include fatty degeneration, fibrosis, myocarditis associated with toxæmia and infection, and ischæmia resulting from a narrowing of the mouths of the coronary vessels, commonly seen in syphilis. All these conditions result in hyperirritability of the cardio-regulatory mechanism, and in cardiac inhibition which often ends fatally in an unexpected manner. I have had cases illustrating each of these conditions, and the lesions are anatomically and histologically demonstrable upon post mortem examination.

Lesions of the mitral and aortic valves are sometimes associated with sudden death. I have had several cases of sudden death apparently based upon an aortic stenosis with co-existing cardiac hypertrophy. Stenosis is commonly associated with a degree of insufficiency. Two factors operate in these cases. The hypertrophy and fibrosis of the myocardium must interfere with the functioning of the neuromuscular system, and the insufficiency may, at times, lower the blood pressure about the mouths of the coronary arteries, with a resulting ischæmia of the already damaged muscle which contributes to the fatal result.

I have had one case of sudden death associated with stenosis of the mitral valve.

Disease of the arteries accounts for more than half of the cases of sudden or unexpected death. Syphilis, atheroma and atherosclerosis, ending in stenosis, thrombosis, aneurysm and embolism, often bring life to an unexpected end, particularly when these lesions involve the coronary, cerebral, meningeal or pulmonary arteries or the aorta itself. I have seen cases in which the mesenteric, appendiceal, adrenal and pancreatic arteries were the seat of lesions which caused a fatal termination. Hypertension is often a factor.

Coronary disease accounts for about 40% of all cases. Syphilis commonly causes a stenosis of the mouths of the coronary vessels, which, in extreme cases may cause an ischæmia of the myocardium with sudden failure. The common lesion is, of course, atherosclerosis of the coronary itself, particularly the left, with a resulting stenosis which alone accounts for a number of cases. Intimal damage results very often in thrombosis with occlusion, and if this occurs within the first 3 cm. of the coronary artery, death comes with tragic suddenness. The youngest case of coronary thrombosis, in my experience, was that of a girl 13 years of age, who engaged in a skipping contest just before going home at noon for lunch. On arrival at home, she was seized with violent cardiac pain and died in a few minutes. The death was so rapid and unexpected that poisoning was suspected. Autopsy showed marked atheroma of the aorta and of the left coronary artery with a thrombus about 1 cm. from its mouth. Investigation of the history showed that the girl had suffered from almost all the common exanthematous fevers between the ages of six and twelve, and this continuous exposure to toxæmias had resulted in an advanced degree of atheroma of her coronary artery. Stenosis and occlusion of the lesser branches of the coronary result, of course, in infarction, and these conditions are often the forerunners of sudden myocardial failure, and, on occasion, of rupture of an infarct with death from pericardial tamponade from hæmorrhage.

I have had one case of rupture of a small aneurysm of the right coronary which gradually filled the pericardium with blood, ending fatally. I have had one case of embolism of the left coronary artery, the embolus arising from a vegetative aortic endocarditis which had pro-

duced some aortic insufficiency. I have had not a few cases of sudden myocardial failure associated with marked stenosis of the lumen of the left coronary without thrombosis or embolism.

Thrombosis and rupture of cerebral and meningeal arteries, and embolism arising from aortic disease, or mitral or aortic endocarditis, occasionally cause unexpected death, not, however so dramatically sudden as those associated with lesions of the myocardium or coronary arteries. Cerebellar and pontine hæmorrhages are ordinarily the most rapidly fatal. The rupture of aneurysms, either of the Circle of Willis, or elsewhere in the cerebral arterial system accounts for a few cases. I have had two cases of presumed accidental deaths, in both of which the accident was the result of the rupture of an intracranial aneurysm, in one case of the basilar artery and in the other, of the right carotid just where it emerges from its foramen.

Embolism of the pulmonary artery provides many a sudden death for the surgeon, just at the time in convalescence when his operative or accident patient is preparing to leave the hospital. The embolus is usually a thrombus from some large vein, commonly near the site of the operation or injury. Death in these cases seems to be due as much to neurogenic and circulatory shock, as to actual interference with pulmonary circulation. This condition was first described by Virchow about one hundred years ago.

I have had six cases of unexpected death due to air embolism, the air being accidentally introduced into the venous system in an attempt to procure an abortion by injecting an antiseptic solution into a pregnant uterus by means of a Higginson type of syringe. I have had one case of rapid death from "castor oil embolism", the castor oil being introduced in the same fashion for a similar purpose.

Thrombosis of branches of the mesenteric artery, hæmorrhage into adrenals from rupture of damaged adrenal arteries, and so-called "pancreatic apoplexy" account for a number of unexpected deaths. The latter may cause death within a half hour of the onset. I have recently had two cases of death of obscure etiology which showed, at autopsy, large retroperitoneal abscesses of the head of the pancreas following an acute onset of "pancreatic apoplexy".

Rupture of aneurysms of the aorta, into the pericardium or into the pleural or mediastinal spaces, occasionally terminates life in an unforeseen manner.

Disease of the veins is the basic factor in many deaths from pulmonary embolism and from hæmorrhage. Angiomata, phlebitis and varicosities predispose to venous thrombosis, as do shock and stasis of the circulation. Escaping thrombi, if large, bring sudden death from pulmonary embolism; ruptured varicose œsophageal or gastric veins result at times in unexpected deaths from massive and at times concealed hæmorrhage.

Lesions of the circulatory system, as stated, account for from 80 to 90% of cases of sudden death. The remaining 10 to 20% are referable to a variety of lesions in the remaining systems of the body, excluding, of course, lesions with a vascular basis.

Sudden death occurs in cases of brain tumour. I recall one of my early cases, in which brain tumour had not been diagnosed, and in which death occurred suddenly during the course of a lumbar puncture. At autopsy, a large glioma of the cerebellum was revealed. The removal of the spinal fluid pressure had allowed the cerebellum to jam itself down into the foramen magnum, resulting in shock from which the patient died immediately. Sudden deaths in cases of epilepsy have been recorded. In my own experience, I have had two cases of unexpected death in epileptics, both due, however, to asphyxia from inhaled vomitus. Aside from a few cases of pachymeningitis interna hæmorrhagica, really a vascular lesion, I have not encountered any case of sudden death from meningeal lesions.

The respiratory system has in my experience furnished cases of sudden death resulting from acute œdema of the larynx and from acute pulmonary œdema of undetermined origin. I have had two cases showing extensive lobar pneumonia, in which the individuals carried on their ordinary activities up to within 24 hours of death. Sudden death in infants is often due to an incipient bronchopneumonia or to capillary bronchitis.

The alimentary system has in my experience furnished cases due to rupture of the œsophagus and rupture of the stomach wall, with escape of gastric contents and digestion of surrounding tissue. I have felt that these cases were probably due to infarction with rupture. I have seen two cases of death in senile individuals due to the apparently spontaneous rupture of the transverse colon distended with fæces. In Macedonia in 1918, I autopsied a

soldier, who fell from a horse and died within the hour, as the result of the rupture of a 2,000 gm. malarial spleen.

Rarely, lesions of the kidney give rise to unexpected death through the onset of a fulminating attack of uræmia, with death within 24 hours of onset. I have observed two such cases, showing at autopsy, third stage glomerulonephritis, but without previous history of nephritis.

Unexpected death in acute infections occasionally occurs. A 16 year old boy working in a tanning factory, scratched his thumb. Iodine was applied to the injury at once. He was taken ill in a few hours and was dead 36 hours after receiving the injury. Autopsy showed the stigmata of septicæmia. Culture from the wound and from the heart's blood gave a flourishing growth of *Strep. hæmolyticus*.

I shall make but a brief reference to the controversial subject of "status thymico-lymphaticus". I have not encountered this classical anatomical syndrome for some years. But in my earlier experience, I had four or five cases of death in youths under the age of 17 years, occurring suddenly under circumstances of insignificant trauma or shock, which at autopsy showed the syndrome of enlarged thymus, hypoplasia of heart, aorta and adrenals, with hyperplasia of abdominal lymphatic tissue. The findings of the Status Lymphaticus Committee of the Medical Research Committee in Britain, and the conclusions of Goldbloom and Wiglesworth¹¹ appear to rule out status lymphaticus as a pathological entity. Boyd,¹² however, states, "There can be no room for doubt that the constitutional disturbance known as status lymphaticus is a real entity".

The fact remains that, on occasion, individuals die suddenly, as a result apparently of trivial shocks, who do demonstrate at autopsy the anatomical syndrome. Death is undoubtedly due to shock, and the question of the relationship of the existence of this syndrome to the condition of extreme hypersensitivity to shock in these cases, is perhaps, still to be elucidated.

SUMMARY

1. Eighty to 90% of cases of sudden or unexpected death are due to lesions or disturbances of the circulatory system.

2. Sixty-five per cent of such deaths are due to cardiac failure.

3. At least 50% of such cases are due to lesions of arteries.

4. About 40% are due to lesions of coronary arteries.

5. A small percentage of cases, even with the most exhaustive investigation, will remain insoluble. These should not exceed 1% of the total.

6. The rôle of lesions of the cardiovascular system in the etiology of sudden death is noteworthy.

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ANÆSTHESIA FOR PLASTIC SURGERY*

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THE practice of anæsthesia for plastic surgery presents many special problems. Most of these problems are of a technical nature, and the satisfactory solution of these not infrequently determines the safety of the patient's life, the ease with which the necessary surgical manipulations may be performed, and the end result of the operation. In this field as in any other it is necessary that surgeon and anæsthetist should each be aware of the problems confronting the other, and that there should be the fullest co-operation in order to obtain the optimum result. The secret of success is good teamwork, backed by good judgment and adequate technical skill.

CHOICE OF TECHNIQUE

The primary factor which determines the choice of technique is the site of operation. For

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those operations which involve only the extremities or the body wall any adequate technique will suffice, provided due consideration is given to certain aspects to be discussed later.

The majority of plastic procedures involve surgical manipulations about the face. A significant number involve procedures within the mouth, nose or antra. Others involve the neck. For all these an endotracheal technique is the one of choice. For those involving the air passages it becomes imperative. We find, also, that those procedures which require the patient to be in the prone position for the whole or part of the operation are more easily accomplished by intubation.

In addition to the necessity of keeping the anæsthetist out of the operative field, there are other considerations which make endotracheal anæsthesia the technique of choice for procedures about the head and neck. The control of bleeding is one of the great problems confronting the plastic surgeon. The life of skin grafts of all types depends on the control of bleeding from the beds on which they are placed. Any obstruction to the airway of the patient even though it be so slight as to cause a scarcely noticeable increase in the respiratory effort, will result in congestion of the venous system of the head and neck, extending to the venules of the skin. This congestion causes oozing, which may defeat the whole purpose of the operation. Proper intubation of the trachea will ensure a patent airway and respiration as free as possible from impediment. At this point it should be pointed out that an endotracheal tube which is too small, or which is obstructed by a kink or by compression is worse than no intubation.

It is desirable as a rule, that the lightest plane of surgical anæsthesia consistent with good operating conditions should be used for patients requiring plastic surgery. Profound muscular relaxation is usually not required, and by the use of light anæsthesia postoperative toxic effects and depression will be avoided. In all cases where the airway is involved in the operation, prompt recovery of protective reflexes is most important.

TECHNIQUES FOR ENDOTRACHEAL ANÆSTHESIA IN PLASTIC SURGERY

Induction.—It is my practice to induce all patients with a small intravenous dose of a short acting barbiturate. I have used pentothal sodium and kemithal for this purpose. This

practice is adopted because we find that this induction is the most pleasant for the patient of the procedures yet available to us. We are concerned with using an induction which is pleasant for the patient because the great majority of patients who are receiving plastic surgical treatment are faced with the prospect of several operations. Any technique, therefore, which abolishes fear of the operating room is well worth while. This technique also simplifies the approach to patients who have surgical conditions about the face which precludes the induction of inhalation anæsthesia by the usual methods.

Intubation.—Following the intravenous induction the ordinary practice is to carry on with cyclopropane, or to continue the intravenous anæsthesia with the addition of nitrous oxide, until the patient has automatic respiration and is moderately relaxed. Intubation is then done by the oral or nasal route, as circumstances may dictate, and the tube is connected to the gas machine. If the anæsthesia is to be continued by the intravenous route with the addition of nitrous oxide, then it is advantageous to spray the larynx and upper portion of the trachea with appropriate topical anæsthetic solution.

When intubation is completed the pharynx is packed with fine mesh gauze, which is impregnated with paraffin oil or vaseline. The pharynx should be relaxed before packing is inserted, otherwise it may be forced by the pharyngeal muscles upward into the mouth, and the system will no longer be airtight. The pharyngeal pack is recommended in preference to any type of pneumatic cuff on the endotracheal tube. It has been noted that anæsthesia for plastic procedures should be maintained in a very light plane. The pressure of an inflated cuff on the wall of the trachea of the lightly anæsthetized patient sets up a gasping reflex which reduces the respiratory exchange of the patient, produces suffusion of the head and neck, and introduces movements which make the surgical procedure difficult.

In most operations about the nose and mouth, too, some blood finds its way into the airway. The pharyngeal pack confines this blood to the mouth, nose and upper pharynx, where it is readily recovered by suction, while the use of the inflated cuff permits soiling of the larynx and upper trachea proximal to the position of the cuff.

The pharyngeal pack must be inserted carefully and evenly on the two sides of the tube. The mouth may be held open by a mouth-gag. With a good light coming over his shoulder, the anaesthetist draws forward the tongue, using an ordinary right-angled tongue spatula. If the patient is relaxed the epiglottis should be easily exposed. The pack is then inserted using a long pair of dressing forceps or Magill forceps. It should be placed well down into the piriform fossa on either side of the tube, and, making sure that the amount of packing is kept equal on each side of the tube, it is continued up to the dorsum of the tongue. If there is no operative procedure in the mouth it is well to lead the end forward to the front of the mouth to assist in recovery after operation.

The decision for nasal or oral intubation will often be dictated by the site and nature of the operation. It will be obvious that oral intubation is out of the question if the operation involves the mouth, chin, or neck. Where operations on the lips are to be performed, care must be taken to ensure that the anaesthetic equipment does not distort the nose and lip. Nasal tubes should not be used for operations on the upper lip, since these tend to distort the upper lip and the naso-labial relationship. An oro-tracheal tube fastened securely in the mid-line of the lower jaw will not produce distortion. In cases where the choice is not dictated in this way, the choice of route will depend on the preference and skill of the anaesthetist. I formerly favoured the use of the nasal route. However, I now prefer to use the oral route, since one is usually able to employ a larger tube, and laryngoscopy and the passage of a tube under direct vision, when properly performed, is less likely to produce trauma than is nasal intubation.

SPECIAL TECHNICAL PROBLEMS

One frequently meets patients with surgical conditions which make the routine procedures described above either difficult or impossible. These include patients who have large defects of the face, recent facial injuries, bulky dressings which may not be removed, or external splints of one type or another supporting fractures of the facial bones.

These patients are best handled by anaesthetizing them to the point of complete relaxa-

tion by the intravenous route and then passing the endotracheal tube immediately under direct vision, inhalation anaesthesia being commenced from that point through the tube. The use of direct vision is recommended for nasal intubation in these patients because, should the first attempt at blind intubation fail, the patient may have a troublesome spasm of both the larynx and pharynx at the next attempt. Except in those patients who have blood and debris in the airway, it is well to produce topical anaesthesia of the lower portion of the pharynx and of the larynx before attempting intubation. In those patients with blood and debris present in the pharynx this is not practical, and the tube should be passed immediately to secure the airway and to prevent aspiration of foreign material.

In addition to that type of difficulty just outlined, one is not infrequently faced with the problem of producing endotracheal anaesthesia in patients who have their teeth wired together, or their lips sutured together. These must of necessity be intubated blindly by the nasal route, but here one usually has the advantage of being able to deepen anaesthesia by inhalation from a face mask before intubation is attempted.

In a large number of operations we find that no matter how placed, the catheter adapter and the connecting tube of the anaesthetic system intrude themselves into the operative field. This is an unnecessary source of anxiety to many anaesthetists and surgeons. These pieces of equipment should be sterilized before use by boiling or by soaking in some germicidal solution. Provided, then, that the anaesthetist's hands are clean when he commences his procedure, surely the exposed bits of equipment will be at least as clean as the patient's skin. They are then "prepared" with the rest of the field before operation, and need give no more concern than the exposed skin. For the past two and a half years I have used vinyl portex endotracheal tubes, which may be boiled repeatedly with little evidence of deterioration.

I think it is accepted practice to lubricate the distal portions of endotracheal tubes with vaseline or some jelly preparation. The use of a 5% pontocaine or nupercaine ointment as a lubricant is probably useful in minimizing the tendency of the patient to cough when the head is moved during light anaesthesia, and during recovery after the tube has been removed.

CARE OF PATIENT AT CONCLUSION OF OPERATION

It is wise to remove the packing and the endotracheal tube at the conclusion of the operation before the head is moved about in the application of dressings and bandage. In cases where this is not practicable, or where it is neglected, patients frequently have a sore throat on recovery. This results from movement of the tube in the larynx, and the friction of the packing in the pharynx.

Following the removal of the packing, the pharynx should be inspected for small abrasions and those found may with benefit be painted with a 20% mercurochrome solution. It will be found that this simple treatment usually prevents a complaint of sore throat.

Before dismissing the patient, aspiration of the pharynx should be efficiently performed, removing all blood and mucus. This not only reduces the possibility of aspiration of foreign material into the lower respiratory tract, but prevents a great deal of post-anæsthetic gagging and coughing. In cases where the agent used has been ether, it has a definite influence on the incidence of post-anæsthetic vomiting.

AGENTS USED

Inhalation agents.—The anæsthetic agents used should be those which produce the least postoperative unpleasantness for the patient, while providing adequate operating conditions, since many of these patients will require a series of operations. We have found that the combination of pentothal or kemithal with cyclopropane or nitrous oxide are ideal from this point of view, using barbiturate for induction only when cyclopropane is used, or throughout the operation when nitrous oxide is employed. We rarely see postoperative retching and vomiting after these combinations. Postoperative bleeding from a graft bed may be determined by postoperative straining, so there is much value in the use of these combinations of agents quite apart from consideration of the patient's discomfort.

Many surgeons profess to dislike cyclopropane anæsthesia on the ground that it is responsible for oozing in the operative field. In a series of cases some years ago we found that it was impossible for the surgeon to distinguish between cyclopropane and nitrous oxide-ether anæsthesia on this basis. It is probable that cyclopropane earned this reputation due to accumulation of CO₂ in the closed anæsthetic system. Accumulation of CO₂ will certainly produce bleeding, no

matter what the agent, and greater attention should be paid to this factor.

Epinephrine.—It is the common practice of plastic surgeons to inject a solution containing epinephrine about the operative field to produce hæmostasis. The concentration used varies between 1:120,000 and 1:60,000, and rarely is more than 6 to 8 c.c. of this solution injected. In no case have I seen any ill effects from this practice with any agent, including cyclopropane.

On the other hand, I cannot condemn too strongly the practice of applying packs soaked in epinephrine solution to vascular raw areas in order to produce hæmostasis. Absorption from such areas is extremely rapid, and I have seen several patients in profound shock and with completely irregular pulse in these circumstances.

Regional anæsthesia.—Nerve block anæsthesia is particularly useful in plastic surgery of the extremities. I believe that for operations on the tendons about the hand and wrist, regional anæsthesia is the method of choice, because usually one finds that motor function has returned before the end of the operation, while anæsthesia persists for a considerable time, and the patient is able to perform voluntary movements at the request of the surgeon. For repair of tendons in the palm of the hand one may produce anæsthesia while retaining full motor power by blocking the median and ulnar nerves at the wrist, providing that the surgeon is willing to forego the advantage of a tourniquet in return for the advantage of voluntary movement of the involved tendons.

In cases where the only anæsthesia required for the cutting of a skin graft, block of the lateral femoral cutaneous nerve will usually provide anæsthesia over an adequate area in the thigh.

THE BURNED PATIENT

It should be stated as a rule that the severely burned patient should never be given an anæsthetic if it can be avoided. If an anæsthetic agent is necessary for treatment, it should be as short and as light as possible, and the anæsthetist must take whatever steps are necessary to remedy the physiological disturbances, before anæsthesia is induced.

The choice of agent for the burned patient is probably open to question. I have found pentothal plus nitrous oxide most satisfactory.

It should be remembered that hepatic and renal damage frequently follow severe burning, and the anaesthetist would be wise to determine the function of these organs before choosing an anaesthetic agent for a burned patient.

A special difficulty in intubation is presented by the burned patient with scar contracture about the face and neck. Such contractures may produce stenosis of mouth and nostrils and fix the chin so that it is impossible to lift the head forward or to extend it. In such cases one must manage a blind nasotracheal intubation.

THE PROBLEM OF MUSCLE RELAXATION IN SURGERY*

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THE Canadian Anaesthetists Society has for its motto the Greek words, *καθευδοντας παρατηρουμεν*, (*katheudontas parateroumen*), which might be interpreted—"We watch closely those who sleep". Nowadays, watching closely those who sleep involves more than just bringing them back alive from the operating room: it means *safe* sleep and *safe* awakening. The duty of the modern anaesthesiologist comprises attention to: (1) The safety of the patient before, during and after operation. (2) The comfort of the patient. (3) Provision of the best possible working conditions for the surgeon.

The second and third duties are really corollaries of the first. We now know that comfort during operation—freedom from fear—is not just an extra luxury for private patients. Fear plus anaesthesia is a dangerous physiological combination, and the removal of fear, the promotion of comfort and calm, is one of the important factors in safe anaesthesia. Similarly, it is obvious that for good surgery one must have proper working conditions; hence the anaesthetist's duty, in the interest of the patient, to provide such conditions.

This paper deals with one phase of this third part of the anaesthetist's duty, that is, the provision of muscular relaxation adequate to permit efficient, safe surgery. To study the problem of

muscle relaxation effectively it is necessary to review briefly our knowledge of muscles—how they contract and how they relax. In the living animal muscles are in a state of *tonicity* or *tonus*, and if the nerve supply is intact, a cut muscle retracts and the two parts separate. Thus a muscle, even at rest, is in a favourable condition to contract without losing time or energy in taking in slack. Muscular tonus is under the control of the nervous system. Muscles lengthen when their nerves are divided or when they are rendered physiologically nerveless by drugs. The actual transmission of the nerve impulse from motor end plates to muscle cells is now known to depend on the presence of acetylcholine, a substance which plays such an important rôle in the translation of all nerve impulse into other phases of biological activity.

Skeletal muscle may be cut off from its nerve supply and thus rendered not only inert but devoid of tonus in one of three ways: (1) by central nervous system paralysis, in which case the paralysis must be complete enough to involve also reflex pathways in the spinal cord; (2) by severance or paralysis of the motor nerve pathway from the cord to the muscle; (3) by interference with the acetylcholine reaction at the motor end plates in the muscle itself.

We can never interfere with normal physiological function without some price being exacted from the patient in terms of metabolic upset, visceral damage, hypoxia, temporary or permanent disability, or other untoward reaction. In anaesthesia, as we attempt to secure for the surgeon adequate muscle relaxation, our problem is to choose the method for which the patient has to pay the lowest price for this physiological interference.

Let us examine the various anaesthetic agents and methods from this point of view. *General anaesthesia* produces muscular relaxation mainly because of its central action, the exact mechanism of which we do not yet entirely understand. The cost to the patient in terms of toxicity rises in almost direct proportion to the efficiency of these agents in their ability to produce muscular relaxation. For ether anaesthesia deep enough to produce complete relaxation the patient pays with respiratory irritation, metabolic upset and postoperative discomfort. For chloroform he pays with visceral and possibly cardiac damage. Deep cyclopropane, while more rapidly eliminated than ether or chloroform, in some indi-

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viduals endangers respiratory and cardiac function. The other general agents, inhalation, intravenous and rectal may not be so toxic in anæsthetic doses but they are not efficient relaxants. There is not much physiological cost to the patient in ordinary anæsthesia with pentothal, ethylene or nitrous oxide, but neither is there a satisfactory surgical field for most major operative procedures.

With local, regional block and spinal anæsthesia, muscular relaxation is produced because of motor nerve paralysis. The cost of this to the patient may be in untoward reactions, apprehension, and incomplete sensory paralysis. Aikenhead¹ has called our attention to the sequelæ of spinal anæsthesia. His review and the reports of many others remind us that in spite of the usefulness and wide applicability of these methods of anæsthesia they are not without danger. All of us have had personal experience with untoward reactions following the misuse of, or hypersensitivity to, local and spinal anæsthetic agents.

The third way of obtaining muscle relaxation is by *interruption of the myo-neural junction*. This type of paralysis has been known to physiologists ever since Claude Bernard's classic experiments with curare nearly one hundred years ago, but for our present conception of the actual physiological process involved we are indebted to Loewi's comparatively recent discovery of the rôle of acetylcholine. We now believe that acetylcholine is the chemical activator produced by electric stimuli at motor end plates, and that it causes muscle cell contraction. The presence of curare or some other curare-like drug will interfere with the acetylcholine reaction, probably by the production of a preponderance of choline esterase. The disease myasthenis gravis so closely resembles chronic curare intoxication that it is now believed that in this disease there is the same kind of interference with acetylcholine production.

Every medical student has seen curarized frogs or other laboratory animals, and we have known that the action of curare is temporary and reversible, but the conception of curare as a drug of clinical value for the intentional production of temporary muscle relaxation is something which is quite new. West, Burman, Gill, MacIntyre and Bennett were pioneers in the modern application of a purified curare to clinical medicine. In 1940 Dr. L. H. Wright of

E. R. Squibb & Sons suggested to me that curare might be the answer to the anæsthetist's prayer for a rapidly acting non-toxic muscle relaxant. In January, 1942, I began to use it in patients under cyclopropane anæsthesia. Our first report² attracted the notice of other anæsthetists, notably Cullen,³ of Iowa, and started developments which have brought curare now to an apparently permanent place of usefulness in anæsthesiology. Personally, I have administered "Intocostrin", the Squibb extract of standardized curare, to 800 patients, and the total administrations by others amount to many thousands, so I feel that we can begin to assess its value, particularly in regard to the physiological cost to the patient.

Is curarization a less costly means of securing adequate muscle relaxation than the use of the other agents and methods which I have described? My answer to this question is "Yes", with certain reservations. When curare is administered in proper therapeutic dosage it produces an effect of short duration, which seems to be entirely confined to the myo-neural junction. There is no demonstrable effect on metabolism, blood pressure, or visceral or cardiac function, and there are no postoperative sequelæ. However, when curare is given in dosage larger than that necessary to provide muscular relaxation we see evidence of the central effect which has been described by several experimental investigators.^{4,5} This may produce unconsciousness, respiratory paralysis, bronchial spasm, increased bronchial secretion, and slow recovery. The recent work of Cole,⁶ of Minnesota, on the toxicity of curare reminds us that the drug is still a poison when improperly used. He has also shown, however, that when curare is given together with oxygen and controlled respiration, doses enormously larger than those required in clinical anæsthesia may be given without permanent damage to the animal.

In my opinion the best way to produce relaxation sufficient for satisfactory surgical manipulation lies in a judicious combination of non-toxic anæsthetic agents with curare. The trend toward a mixture of anæsthetic agents is widespread, and I believe it has sound pharmacological basis. Toxicity of most agents is usually in direct proportion to the size, rate and concentration of the dose, and a combination of small doses of several agents sufficient to produce the required relaxation

is seldom as toxic as a large dose of a single one of those agents. Nitrous oxide, ethylene, pentothal or light cyclopropane combined when necessary with curare provide relaxation sufficient for almost any surgical procedure. By this I do not mean that curare should be used routinely even in abdominal operations. In our hospital we are now finding it advisable to use curare in 41% of our abdominal cases (Table I). A wide variety of combinations of

In closing, may I add one word of appeal from anaesthetist to surgeon. In recent years, by the introduction of new agents and methods, anaesthetists have done much to safeguard the patient and speed his recovery. We have interested ourselves in oxygen, in analeptics, in supportive fluid therapy; we have supervised blood banks and recovery rooms.⁷ Now we have given the surgeon curare for better muscle relaxation. It is our considered opinion that

TABLE I.

<i>Agents and methods</i>	<i>Number of cases</i>	<i>Agents and methods</i>	<i>Number of cases</i>
Cyclopropane (alone)	795	Pentothal and nitrous-oxide	9
Cyclopropane and curare	292	Pentothal, nitrous-oxide and ethylene	2
Avertin and cyclopropane	140	Pentothal and ethylene	2
Avertin, cyclopropane and curare	36	Spinal (various agents)	86
Pentothal and cyclopropane	202	Spinal and cyclopropane	46
Pentothal, cyclopropane and curare	39	Spinal and ethylene	1
Pentothal, cyclopropane and ethylene	8	Spinal and pentothal	56
Pentothal, cyclopropane, avertin and curare ..	1	Spinal and nitrous-oxide	8
Pentothal, cyclopropane, ethylene and curare ..	4	Spinal, cyclopropane and curare	9
Ethylene and cyclopropane	24	Spinal, pentothal and cyclopropane	10
Ethylene, cyclopropane and curare	21	Spinal, pentothal, cyclopropane and curare ..	4
Avertin, ethylene and cyclopropane	2	Ether	6
Avertin, ethylene, cyclopropane and curare ..	2	Local anaesthesia and curare (bronchoscopy) .	6
Nitrous-oxide and cyclopropane	5	Refrigeration	4
Nitrous-oxide, cyclopropane and pentothal	1		
Nitrous-oxide	12		
Pentothal	167	Total	2,000

Endotracheal anaesthesia in 586 of these cases. Curare given in 20.5% of all cases.

agents and of methods has been in use during the past year. Cyclopropane, either alone or with curare, is still the agent most frequently employed, but pentothal in moderate doses and of varying concentration from 2.5% to 1:1,000 enters into many of the combinations, and we are returning to that very valuable and recently neglected agent, ethylene.

I do not wish entirely to decry the value of spinal anaesthesia; in fact we are using this method more frequently than formerly for some purposes, particularly for major gynaecology and in obstetrics. In our spinal anaesthetics we use combinations of different drugs in as dilute concentration and as small doses as we feel will give the desired result. The modern anaesthesiologist should have at his command a whole array of drugs and methods which he can alter or combine in any way the circumstances of the occasion demand. Curare, when used intelligently and with discrimination, is one more safe drug to add to the anaesthetist's pharmacopoeia. It does enable us to provide the surgeon with muscular relaxation sufficient for any surgical procedure and without permanent physiological cost to the patient.

slow surgery is responsible for much of the remaining physiological upset and delayed recovery of our patients. The best surgeon is the one who handles tissues gently, knows what he is doing, does it quickly, and gets out of the abdomen or chest with no time wasted in "puttering". The expert should not need "wet rag relaxation" for every laparotomy. Good anaesthesia with non-toxic agents, plus speed, and friendly collaboration between anaesthetist and surgeon, is the ideal combination for safe surgery.

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RÉSUMÉ

Le curare administré avec un agent anesthésique non toxique semble amener le relâchement musculaire idéal. Ce produit, administré comme il convient, n'offre pas de danger sérieux. Avec les seuls anesthésiques connus il faut parfois atteindre des doses trop fortes pour la sécurité du malade si l'on veut obtenir le relâchement désiré par le chirurgien. Toutes choses égales d'ailleurs, on obtiendra les meilleurs résultats quand le chirurgien sera un opérateur averti, rapide, soigneux pour les tissus et offrant à l'anesthésiste les garanties d'une amicale collaboration.

JEAN SAUCIER

PHLEBOTHROMBOSIS AND ITS TREATMENT*

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VENOUS thrombosis and embolism or thrombo-embolism is beyond doubt one of the most important and dreaded complications of immobilization, whether this depends on surgical procedures or illness necessitating prolonged bed rest. It is found in 11½% of all those who die within a month of a surgical procedure, and in nearly half of these it is the main cause of death.¹ It kills about 5% of those who recover temporarily from an attack of coronary thrombosis. It may strike down the apparently healthy without warning and without apparent cause. Let me cite one or two instances.

A university professor notices some pain in the calf at the end of a game of squash. He limps home and tells his wife he has a "charley horse". There is no swelling of the leg, only a little tenderness in the calf. The leg is slightly tender for a week. Suddenly without warning there is an agonizing pain in the chest, followed by a short period of cyanosis and difficult breathing. Before a colleague can be reached embolism has claimed another victim.

The second instance is that of a vigorous man beginning to experience some prostatic obstruction. He enters the hospital for investigation, is cystoscoped, and is examined by an internist who pronounces him quite fit for prostatectomy. The day prior to operation he suddenly cries out with pain in the chest, gasps once or twice and thereafter the story is told by the pathologist. In this case there is no warning leg pain; no single symptom to proclaim the existence of a fragile thrombus in the popliteal vein.

Statistics indicate that 95% of all major emboli to the lung come from one of the veins of the lower extremities.

CAN THIS TYPE OF PHLEBOTHROMBOSIS BE PREVENTED?

Obviously the solution of this problem carries with it the answer to the second, namely the prevention of embolism; no phlebothrombo-

sis, no embolism. The only practical approach is to scrutinize all individuals beyond middle life who must be immobilized for a period of time and to treat them as if they were potential victims. Unfortunately our methods of this type of screening are extremely inadequate. Only a percentage of those who will later develop phlebothrombosis will show demonstrable alterations in (a) the circulation time, (b) the prothrombin time, (c) the vascular endothelium. Nevertheless, in the case of every individual beyond the age of 40 years who must be immobilized for any considerable period of time an attempt should be made to evaluate these factors.

Where doubt exists, measures should be instituted to prevent the possible development of phlebothrombosis. The following is a partial list of conditions likely to lead to phlebothrombosis: (1) Coronary thrombosis; (2) prolonged infections in elderly patients; (3) heart disease with congestive failure; (4) surgical conditions such as leg or spine fractures, herniotomy, gynæcological operations; (5) a past history of phlebothrombosis. It has been estimated that there is a 40% risk of further thrombosis or embolism occurring in immobilized patients with a history of thrombosis or embolism, and of these about 10% will die of fatal embolism (Barker, Mayo Clinic).

WHAT ARE THE METHODS USEFUL IN THROMBOSIS?

(a) *Reduction in the period of bed rest.*—Patients should be allowed out of bed as early as is consistent with the progress of the disease for which they were put in bed, or as soon after an operation as their strength will permit.

(b) *Maintenance of muscle tone.*—The maintenance of muscle tone in patients confined to bed may be accomplished by passive and by active motion. Where active movement of the limbs is possible, the patient should be encouraged to carry out daily exercises which in addition to improving muscle tone increase the circulation rate. Where these exercises are impossible daily massage and passive movements are desirable.

(c) *Posture.*—The mattress of hospital beds is said to exert such pressure on the popliteal space that the venous circulation is impaired when the mattress and frame are raised to hold the patient in the semi-recumbent position. This danger can be avoided.

* Read at the Seventy-seventh Annual Meeting of the Canadian Medical Association, Section of Medicine, Banff, Alberta, June 12, 1946.

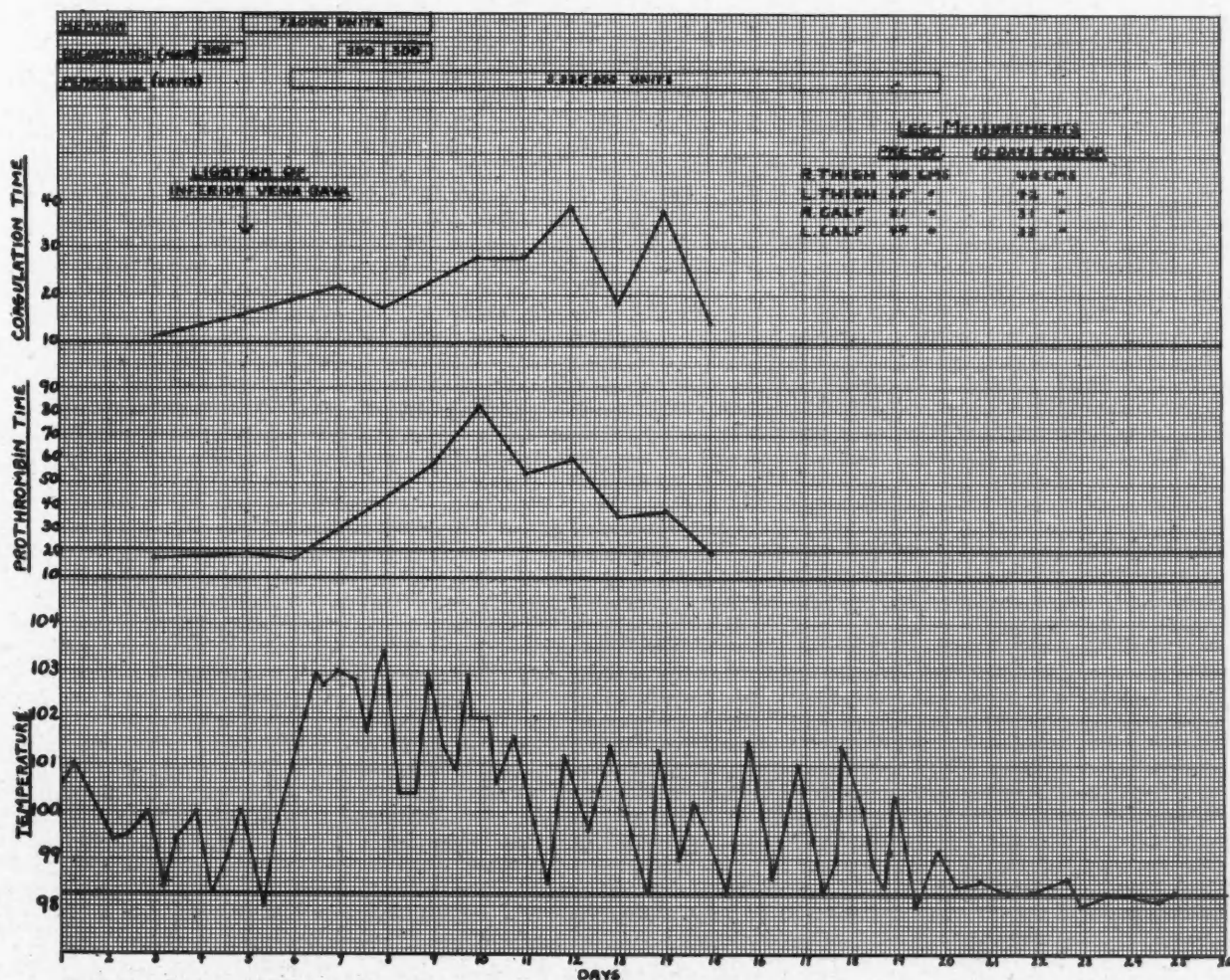
(d) *Inherent clotting tendency.*—When a tendency to clot exists at the beginning of a period of prolonged bed rest—and a coagulogram should always precede such a period, especially in elderly patients—then measures should be adopted to modify this tendency as soon as conditions permit; in medical cases without any delay, in surgical cases after the 3rd or 4th day. This is a safe delay as nearly all serious vascular accidents of an embolic nature occur at a later period.

Heparin and dicoumarol both inhibit clotting. The effect of heparin is best demonstrated by the coagulation time; the effect of dicoumarol by the prothrombin time. Where immediate results are desired heparin should be given intravenously and dicoumarol by the oral route. The maximum effect of the heparin will take place within an hour, the dicoumarol by the third or fourth day. By combining the two drugs and stopping the heparin when the dicoumarol has taken effect any desired delay

in clotting of the blood can be obtained and maintained. In most instances a coagulation time level of 20 to 25 minutes or a prothrombin time of 30 to 40 seconds is the optimum. Little or no danger of untoward hæmorrhage may be anticipated unless these levels are exceeded.

THE TREATMENT OF VENOUS THROMBOSIS

Once phlebothrombosis has manifested itself—and the site is invariably the deep veins of the lower extremities—what measures should be employed to prevent pulmonary embolism? These are in the main two; ligation and anticoagulation therapy. Incidentally, any pain or tenderness in the calf of the leg, however slight, coming on while the patient is in bed must be regarded as a phlebothrombosis until proved otherwise. Homan's sign—pain in the calf when the foot is dorsiflexed and the calf muscle placed under tension—is probably the most valuable sign of thrombosis in the deep



THROMBOPHLEBITIS OF LEFT COMMON ILIAC VEIN WITH THROMBOSIS EXTENDING INTO THE INFERIOR VENA CAVA. TREATED BY LIGATION OF INFERIOR VENA CAVA, HEPARIN AND DICOUMAROL WITH PROMPT CLINICAL IMPROVEMENT AND COMPLETE CURE.

Chart 1

veins of the calf. Indeed it is often the only sign present.

1. *Femoral ligation.*—There are clinics in which ligation of the femoral veins distal to the profunda invariably precedes a major operative procedure, and others in which the vein is tied as soon as phlebothrombosis is suspected. Such a course would seem to be unduly radical and yet there are probably few physicians who have ever regretted ligating the femoral vein above the thrombus and many who have watched a patient pay the supreme price for their indecision.

Permanent œdema of the leg following femoral ligation distal to the profunda is rare. On the other hand, extreme œdema resulting from phlebothrombosis may disappear following ligation as in the case of a recent patient at the Montreal General Hospital whose inferior vena cava was ligated to stop an ascending phlebothrombosis. Chart 1 shows graphically relevant details in this case. The patient a 35-year old male was admitted to the hospital with fever, chills and great swelling of the left leg. Examination revealed a phlebothrombosis extending from the deep veins of the calf into the pelvis. The patient was given dicoumarol and heparinized. Because the thrombus had extended beyond the left common iliac into the inferior vena cava, the latter was ligated just proximal to the end of the thrombus. The leg measurements detailed on the chart show that no swelling appeared in the unaffected leg after ligation and that the swelling of the affected leg almost completely disappeared within 10 days. A second and similar case has since been observed with equally satisfactory results.

2. *Heparin and dicoumarol.*—Heparin and dicoumarol may supplement ligation or they may be employed alone to prevent the building up of a thrombus. The practical aspects of heparin and dicoumarol therapy are these. Heparin has an immediate effect but it must be continuous intravenous injection or in an oily suspension parenterally. Its effect stops almost as soon as its administration is stopped. Dicoumarol is given by mouth. Its maximum effect on the prothrombin time is delayed 48 to 72 hours but continues for about 10 days. Its effect cannot be counteracted adequately or quickly but the effect of overdosage can be modified by transfusion or very large doses of vitamin K.

Another disadvantage of dicoumarol therapy is the variability of effect. The usual dosage is 300 mgm. *stat.* and 200 mgm. the following day. Subsequent doses must depend on the effect of these first two. No further dicoumarol is given until the prothrombin time curve starts downwards, then the 200 mgm. dose is repeated. Individual variation in effect renders daily prothrombin times almost a necessity. However, by means of these two drugs any desired retardation of blood clotting can be obtained and maintained almost indefinitely. If the level is within therapeutic limits no fears need be entertained that hæmorrhage will occur unless there is an open ulcerating surface. The following tables have been compiled by Barker.² They synopsise the results of this form of therapy at the Mayo Clinic.

TABLE I.
POSTOPERATIVE THROMBOPHLEBITIS
(From Barker)

	Control group No anticoag.		Dicoumarol group	
	Number	%	Number	%
Total cases.....	897	100.0	83	100.0
Subsequent episode of thrombophlebitis.....	95	10.6	2	2.4
Subsequent fatal pulmo- nary embolism.....	51	5.7	0	0

TABLE II.
POSTOPERATIVE PULMONARY EMBOLISM AND INFARCTION
(From Barker)

	Control group No anticoag.		Dicoumarol group	
	Number	%	Number	%
Total cases.....	678	100.0	111	100.0
Subsequent venous throm- bosis, pulmonary em- bolism or infarction....	297	43.8	2	1.8
Subsequent fatal pulmo- nary embolism.....	124	18.3	0	0

MASSAGE AND ACTIVE AND PASSIVE MOVEMENT

Massage and active and passive movement may be recommended without fear once the vein has been ligated, but should under no consideration be permitted if the vein has not been tied. It is the part of wisdom to exercise the limbs of a bedridden patient before phlebothrombosis develops, but it is an act of folly to permit it once the thrombus has formed. As a general rule the original thrombus is fairly well fixed to the wall of the vein but from it a propagating platelet thrombus often builds up in the circulating stream of blood free

except for its fixed end. Movement will tend to break this off. Here is some statistical support of this.³

TABLE III.

	Non-exercised group	Exercised group
Cases.....	200	200
Leg or thigh vein thrombosis..	118	88
Fatal pulmonary embolism...	7	11
Not-fatal pulmonary embolism	24	28
Total pulmonary embolism...	31	39
Percentage pulmonary embolism	26.2	44.3

It is clear from these figures that exercise, however desirable in preventing phlebothrombosis, is definitely* not the treatment of choice once it has occurred.

SUMMARY

The incidence of phlebothrombosis can be lessened by reducing the period of bed rest for elderly patients, by a planned schedule for daily movements either active or passive and by the judicious use of heparin and dicoumarol in patients who show a tendency to thrombosis. The presence of a phlebothrombosis calls for early ligation of the vein above the thrombus, in conjunction with heparin and dicoumarol therapy.

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ANÆSTHESIA IN THORACIC SURGERY*

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OPERATIONS necessitating an open chest are now commonplace. The thoracic approach to such structures as the œsophagus, the sympathetic ganglia, and the vagus nerve, and for the repair of diaphragmatic herniæ has become popular. With a normal pulmonary system, patients will tolerate even lengthy procedures with one functioning lung only and when at the conclusion of the operation the collapsed

lung may be reinflated, convalescence comparable to that of other major operations may be expected.

Anæsthesia in these instances ordinarily presents few difficulties. When, however, the lung is the site of operation the problem from the standpoint of anæsthesia is more complicated. Over a period of years the technical details of the operations of lobectomy and pneumonectomy have been perfected to the point where these procedures may be carried out in a satisfactory manner even in the more difficult cases. In the same period of time improvements in anæsthetic methods have been developed which have overcome some of the difficulties associated with this type of surgery. In many respects the problems confronting the anæsthetist are more complex than those facing the surgeon and it is to be regretted that a few of these at least have not as yet been satisfactorily solved. It must be admitted that some of the fatalities following these operations are due to circumstances more closely related to the anæsthesia than to the surgical manipulations, and in these instances there may be some truth in the quip that the operation was a success but the patient died.

In the presence of an open pneumothorax the burden of maintaining adequate oxygenation and of eliminating certain waste products rests upon one lung only. This organ is somewhat handicapped by the position it occupies when the lateral decubitus is adopted, as is usually the case. It may be readily appreciated that under these circumstances interference with free exchange of gases will establish the ill effects of oxygen deficiency and carbon dioxide accumulation in a short period of time. The most frequent cause of impairment of respiratory function is the collection of pulmonary secretions at some point in the bronchial tree of the functioning lung. Respiratory depression from the injudicious use of sedative drugs, spasms of coughing, breath-holding as a result of intercostal muscle spasm or bronchospasm, paradoxical respiration and mediastinal shift are conditions which challenge the ingenuity of the harassed anæsthetist. Any of these circumstances may transform in a few short minutes a patient hitherto in good condition into one verging on a state of circulatory collapse. It is imperative that these complications be prevented or that they be remedied as they arise without delay. Only when these

* Read at the Seventy-seventh Annual Meeting of the Canadian Medical Association, Section of Anæsthesia, Banff, Alberta, June 12, 1946.

aims are satisfactorily accomplished, will anæsthetists feel that their efforts have kept pace with the surgical progress in this field.

This communication is an effort to draw attention to the difficulties likely to be encountered in anæsthesia for surgical procedures involving the lung and to discuss measures which are helpful in obviating or dealing with them as they occur.

PREOPERATIVE PREPARATION

Careful management of the immediate preoperative period will lighten the burden placed on both the surgeon and the anæsthetist during the operative procedure that is to follow. Prolonged drainage with the patient in an inclined position and postured in the manner most effective in clearing secretions from the diseased area should be undertaken when sputum is abundant. Preoperative sedative drugs should be withheld until the patient reaches the operating theatre, so as to eliminate a period during which sputum may accumulate because of a dulled cough reflex. This medication may then be administered intravenously with a period of at least five minutes elapsing before anæsthesia is induced. It must not be excessive. Morphine sulphate gr. 1/6 or pantopon if preferred, combined with hyoscine or scopolamine gr. 1/200 is adequate when secretions are likely to be a factor. When there is little or no sputum, greater degrees of preoperative depression are permissible, particularly in robust individuals. The addition of a barbiturate in small dosage is generally preferable to an increase in the amount of morphine or drugs of that nature. It is not necessary to state that the operation should not be undertaken until the local and general conditions of the patient are the best that can be expected.

CHOICE OF ANÆSTHETIC

Much has been written concerning the selection of the anæsthetic agent or method for these patients. Some groups prefer a form of regional block and there are good arguments in favour of a conscious patient. Despite an open chest, secretions may be cleared with a considerable degree of effectiveness in most instances, even with spinal anæsthesia. A paravertebral or intercostal block is, however, a major procedure in itself, and is not acceptable to many of these invalids. Spinal anæsthesia is not an exact science with respect to precision in control of levels and should a too extensive motor nerve block result, a serious situation develops if

effective coughing efforts cannot be maintained. Further, on occasion the analgesia may wane before the operation can be completed. It appears that many of those anæsthetists formerly advocating spinal anæsthesia have returned to inhalation methods, particularly as new agents appeared and techniques in general improved. It is quite possible, however, that in operations such as the drainage of a large lung abscess, some form of regional block is indicated. When spinal anæsthesia is undertaken, techniques designed to preserve motor root effects to the greatest possible degree are desirable.

Cyclopropane, a potent agent, permitting high oxygen percentages in the anæsthetic mixture and in general not stimulating to the glands of the bronchial mucosa, is used to the exclusion of all others by many anæsthetists. This anæsthetic, however, depresses reflex activity to a moderate degree only even at comparatively deep anæsthetic levels and intubation of these "broncho-sensitive" patients is prone to set up spasms of coughing with which is associated bronchospasm and intercostal muscle rigidity both of which may be severe. The term "bucking" has been applied to and is descriptive of this complication. Several minutes may elapse before proper breathing can be restored, during which time forcing oxygen into the lungs is not easy. Manipulations near the root of the lung on the part of the surgeon at a later and possibly a critical point in the operative procedure may change the position of the catheter relative to that of the trachea, and without warning similar episodes involving the same train of circumstances may be engendered.

I agree with those who take the position that in many instances the addition of ether to the anæsthetic mixture is a justifiable measure. There is not much evidence that ether promotes bronchial secretion or that its use in thoracic surgery is followed by an increase in the incidence of postoperative complications of a pulmonary nature. Cyclopropane-ether-oxygen mixtures permit intubation without incident. Ether is mildly stimulating to respiration and when added to cyclopropane mixtures tends to reverse the depressant respiratory effects of that agent. Excellent results have been reported from clinics employing ether-oxygen techniques exclusively. It is possible, however, that its use is undesirable in patients suffering from active pulmonary tuberculosis.

Other methods are of value in some circumstances. A nitrous oxide-oxygen-curare combination suggested recently is of particular usefulness when the surgical condition requires the employment of high tension electrical currents or the actual cautery. In general, nitrous oxide, though innocuous, is not a satisfactory agent for patients handicapped from a pulmonary standpoint. Intravenous barbiturate anæsthesia has little place in intrathoracic surgery. It depresses both respiratory and circulatory function and a single coughing incident particularly during induction may initiate laryngospasm and breath-holding following which undesirable outpouring of mucous secretions is prone to occur. Chloroform as an adjuvant to other agents will be useful on occasion.

In the selection of anæsthetic it is logical to choose the one appearing to be most suitable to the individual patient. The depressed or debilitated subject may be managed comfortably with cyclopropane. The more robust or the highly sensitive individual may require the addition of ether in order to secure the tranquillity so desirable during the early stages of these operations. Some patients are best managed with a form of regional anæsthesia. The use of diathermy necessitates a non-inflammable anæsthetic mixture.

ANÆSTHETIC METHOD

Whatever inhalation agent is chosen, the closed carbon dioxide absorption technique, either the to-and-fro or the circle filter, offers advantages not found in other methods. The practice of intubation is agreed generally to be indispensable. Oral is preferable to nasal intubation, in which compression of the catheter at some point in the nasal passage interferes not only with the airway but with the free passing of the suction catheter. The endotracheal tube ensures good exchange at all times and provides a means for the removal by suction of the pulmonary secretions which constitute the major source of the complications arising during these operations. It permits the application of positive pressure and controlled respiration when these measures are indicated. The incidence of paradoxical respiration and mediastinal instability, complications due mainly to the failure to maintain conditions permitting free ingress and outflow of anæsthetic gases, is materially reduced. The catheter should be large enough to comfortably

fill the space between the vocal cords. An inflatable cuff is preferred by many anæsthetists but carries the disadvantage that on inflation troublesome reflexes may be engendered unless the anæsthesia is relatively deep. A short catheter without the cuff used in conjunction with a small closely fitting face mask appears to be equally satisfactory. The mask may be removed when suction becomes necessary.

There is little tendency for anæsthetic gases to be forced into the stomach under these conditions even during the application of positive pressure. Endobronchial intubation and the use of a suction catheter equipped with an inflatable cuff, the latter a measure advocated by Magill, are of definite value in some instances. These procedures require manipulations of a highly technical nature and are likely to be successfully carried out only by those skilled in bronchoscopic procedures in general. Future researches in these directions may be the means of solving some of the problems still causing concern to the anæsthetist interested in thoracic surgery.

CONDUCT OF ANÆSTHESIA

All the resources available to the anæsthetist should be utilized in the endeavour to conduct anæsthesia without untoward event in these patients handicapped by pulmonary disease and by an open pneumothorax. Inadequate ventilation of the single functioning lung from any cause brings about rapid deterioration in the patient's general state. Oxygen deficiency and carbon dioxide accumulation lead to an exhausting hyperpnœa with which is associated an increase in bronchial secretions. Cardiac function during the remainder of the operation may not again be restored to its former efficiency even though these episodes be of short duration only. A smooth induction is therefore essential and of the agents available cyclopropane being potent and bland is close to being ideal for bridging this hazardous period.

When it is desirable to continue its use throughout the entire operation unfortified by other agents, deep anæsthesia preferably with controlled respiration will reduce to a minimum the reflex disturbance caused by intubation. When ether is to be the main agent, the transition period must be managed carefully if irritation is to be avoided. As soon as intubation

has been accomplished, thorough suction through the endotracheal tube, previously lubricated on its inner aspects, should be carried out. The suction catheter must be of a calibre sufficiently large to permit the aspiration of tenacious sputum but not of a diameter that will prevent ingress of air around it at all times. Collapse of the lung can be a consequence of an overly large suction tube. In bilateral disease posturing the patient on his operative side for a few moments may drain sputum from the lung which is to function during the operation. It is profitable to lighten the anæsthesia to the point at which a cough or two is permitted, which manœuvre may bring deep secretions within reach of the suction catheter.

Excessive coughing activity is seldom encountered under these circumstances either with ether anæsthesia or with cyclopropane when controlled respiration is in progress. I am of the opinion that complete obliteration of the cough reflex throughout the entire operative procedure is not necessarily sound practice. It is commonly noticed that following a single coughing effort sputum will be projected into the bronchus or trachea. Escape of the secretions into the functioning lung may be prevented, provided that aspiration is undertaken promptly. It has been my experience that pneumonia in the contra-lateral lung is relatively uncommon in these cases following spinal anæsthesia in which coughing is the only means by which secretions may be evacuated.

As the chest wall is being opened thorough suction should be resorted to in order that the secretions expressed from the collapsing lung may be removed. Fresh manipulations on the part of the surgeon at other points in the operation require similar action. It is essential that there be no interference with the ventilation of the single functioning lung; preserving an adequate pulmonary exchange is one of the principle duties of the anæsthetist. Any lessening in the excursions of the breathing bag must be investigated promptly. When suction through the catheter is not effective in restoring the necessary tidal volume, a change in the position of the endotracheal tube may improve the situation. Pushing the catheter into a bronchus may allow the suction catheter to reach the source of the obstruction. When these efforts fail, manual pressure on the breathing bag is an aid to better pulmonary exchange. Controlled respiration and some degree of positive

pressure may be necessary to prevent the initiation of paradoxical respiration and mediastinal shifting which so often follow in the wake of periods of distressed breathing. It is good practice to halt the operation at short intervals to permit the anæsthetist to inflate momentarily the collapsed lung which otherwise may become cedematous.

Positive pressure anæsthesia should be maintained for short periods of time only, for if prolonged, embarrassment of the circulation may follow, possibly because of derangement of the negative phase of respiration. During the closure of the chest wall in the operation of lobectomy moderate degrees of pressure are required in order to re-inflate the remaining portions of the collapsed lung. Anæsthesia should be lightened during the later stages of all intrathoracic operations in an effort to ensure the early return of the cough and other reflexes. The patient anæsthetized with ether during the early period of the operation will not be subject to troublesome reflexes or nausea when a change to cyclopropane is made. It is desirable also when controlled respiration with cyclopropane has been in progress to restore normal breathing during closure so that an estimate may be made of the tidal volume before the operation is completed.

When bilateral disease is present, damming up of sputum in the contralateral lung may occur during the operative procedure. In other instances, secretions may escape the suction catheter and so reach the sound lung. When the dressings are in place, reversing the position of the patient on the table, and raising and lowering the head with the suction catheter constantly in action are measures often effective in removing the offending material. At this point the patient will resent the catheter and will cough vigorously if the anæsthesia has been properly lightened. When in spite of these measures the administration of high percentages of oxygen is necessary to keep the patient a good colour, further action is indicated. Some part of either lung may not be functioning, most likely because of a blocked bronchus. If so, collapse of the area involved almost certainly has taken place at some period during the anæsthesia. The necessity of maintaining inordinately high oxygen percentages in the anæsthetic atmosphere during the later stage of the operation will warn the anæsthetist of the probable existence of this complication. In this case

he will maintain anæsthetic levels which will permit the passage of the bronchoscope at the close of the operation. Placing the patient in a high oxygen atmosphere is not a substitute for bronchoscopic drainage under these conditions. Patients in whom secretions have been a factor should be placed in their beds in a lateral head-down position with the sound side uppermost, for a period of some hours.

Anæsthesia in thoracoplasty is less eventful than in the intra-thoracic operation. Since these patients are suffering from pulmonary tuberculosis of an active nature, anæsthesia should be conducted with the particular view of creating the least possible disturbance, mechanical or irritative, to lung tissues. Anæsthesia with cyclopropane during which little increase in respiratory rate and depth is evident, appears to be reasonably satisfactory so far as spread of disease is concerned. Patients requiring thoracoplasty are chronic invalids and are subjected to operation only after long periods of inactivity. In general they are not difficult patients for anæsthesia. There is some difference of opinion as to whether intubation should be practised as a routine measure. No matter how carefully anæsthesia is induced, passing the catheter is prone to stir up reflex activity which could be instrumental in spreading the infection. Adding ether to the mixture to the degree that reflexes are abolished is a procedure open to question. Many patients do surprisingly well without the endotracheal tube.

Some degree of laryngospasm is a common occurrence, generally arising when the periosteum is being stripped from the ribs. Complete closure of the glottis in most instances will not result with careful management of the anæsthesia. When, however, this complication occurs and when manual pressure on the breathing bag does not force oxygen beyond the obstruction, the anæsthetist finds himself in an extremely difficult situation. Intubation with the patient in the lateral position is not easy although it may be accomplished. An olive-tipped gum elastic catheter is useful in this circumstance and will provide a temporary airway. It is imperative that some degree of gaseous exchange be established without delay. Not only is the need for oxygen particularly urgent in these individuals but collapse of the lung due to the absorption of oxygen and cyclopropane beyond the larynx, will result unless

the obstruction is overcome. Paradoxical respiration may be generated by moderate degrees only of laryngospasm in those patients having had ribs removed at previous operations.

Pressure on a large pack, exerted by the hand of one of the surgical assistants over the weakened area of the chest will help to overcome this complication. Anæsthetists using cyclopropane for thoracoplasty must make the choice as to the advisability of intubation. Except in subjects likely to be difficult I prefer at the moment to accept the risk of laryngospasm rather than to intubate all patients, or to use ether. The addition of helium to the anæsthetic mixture will be of some value when the use of the catheter is not anticipated.

Other methods of management may be equally or possibly more satisfactory. Intravenous anæsthesia with a barbiturate when the pulmonary disease is not extensive has some advocates and may be of value particularly when reinforced by nitrous oxide, cyclopropane or curare. Spinal anæsthesia is being employed by well qualified observers. If it can be shown that there is less spread of the tuberculous disease in the lung, the risk involved in a subdural block adequate for the first stage operation, may be justified.

In thoracic surgery demands greater than usual are made upon the skill and patience of the anæsthetist. The main problem is that of maintaining adequate pulmonary function in the presence of a vital capacity seriously impaired by disease and by the operative manipulations. The operations are long and are productive of considerable blood loss and shock. The necessity of supportive measures is obvious; therapy of this nature should be commenced before the incision is made. The anæsthetist must be on the lookout for cardiac disturbances due to reflex parasympathetic overactivity in the event of which an immediate block at the hilus of the lung is indicated. He must accept the responsibility of the decision as to whether respiratory function at the conclusion of the operation is such that the patient may be returned in safety to the ward without further interference. Anæsthetists engaged in this work might well familiarize themselves with the use of the bronchoscope. In few other procedures does the anæsthetist bear so great a share in determining the success or failure of the surgical effort.

BONE LESIONS ENCOUNTERED DURING INFANCY*

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MANY abnormalities are to be found in the bones of infants and in this short presentation it will only be possible to mention a few of the more common and interesting.

RICKETS

This is still the most frequent lesion in spite of the fact that the cause is well known to be a deficiency of vitamin D in the food and lack of exposure to ultraviolet radiation. It is evidently more apt to occur in the coloured race and certainly develops earlier in premature than in full term infants. The bone changes lag behind the biochemical changes by several weeks and are rarely evident before 3½ months of age. They are best seen at the ends of the long bones where growth is most rapid.

The costochondral junctions are very valuable for pathological study but they are relatively poorly shown in radiographs, and the knee and wrist are the regions most frequently studied. The earliest changes are often visible at the distal end of the ulna and it may be considerably later before comparable abnormalities appear at the distal end of the radius or around the knee. At the elbow where growth is very slow, changes appear very late if at all. Inadequate calcification of newly formed cartilage and bone with continuing physiological decalcification of the bone and cartilage which was calcified prior to the development of the rickets constitute the cardinal features. Hence the normal white lines at the ends of the shafts of the bones become rarefied and frayed and ultimately disappear. Cupping may develop particularly at the distal end of the ulna and at both ends of the fibula. It is less likely to appear at the distal end of the radius and at the distal end of the femur or the proximal end of the tibia, probably because these regions are normally somewhat convex. Slight cupping of the ulna may be present in normal infants and cupping *per se* is not diagnostic of rickets for it also occurs in scurvy.

As the disease progresses the changes at the ends of the bones become more evident and where epiphyseal centres are ossified, such as at the distal end of the femur and the proximal end of the tibia, apparent separation between the end of the shaft and the epiphyseal centre develops due to the presence of osteoid tissue (bone without calcium). At the same time the shafts of the bones become abnormal. Their radiographic density decreases, the cortices become thin and trabeculations appear coarsened. Fractures of the greenstick variety are not at all unusual and may produce considerable deformity, even though they seem to cause little pain. The epiphyseal centres also become demineralized and lose their normal white outlines and in extreme cases they may practically disappear.

If the rickets is of the so-called hypertrophic variety there is usually more deformity of the long bones than there is in the atrophic variety. In the former the activity of the infant is not so markedly restricted and the bones suffer from more stress and strain than they do in the latter where comparatively little movement is attempted.

When healing occurs, the first change usually noted is the appearance of calcification in the region of the zone of provisional calcification. This may appear to be some little distance from the end of the shaft of the bone, particularly in marked rickets, due to the fact that osteoid tissue and not bone is present between the epiphyseal plate and the ossified shaft. This osteoid zone will gradually become recalcified and bridge the apparent gap. Similar recalcification occurs around the epiphyseal centres and the shafts of the bones gradually return to normal although at a slower rate. The new bone which forms will be normal if the vitamin intake is continued, but the old shaft may retain coarsened trabeculations for months and remain visible in contrast to the new bone particularly near the point where they join.

Knock knees, bow legs, etc., commonly result from rickets. If the bending is not too extreme, subsequent growth, and the laying down of the new bone on the concave aspects of the shafts will overcome the deformity. Osteotomy may be necessary when marked deformity must be corrected but fortunately such cases are now reasonably rare. The rachitic sabre shin consists of forward and lateral bowing of the tibia and of the fibula to a lesser extent usually in their

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lower thirds. It can be distinguished from the luetic sabre shin by the fact that the bones are bent, with cortical thickening on their concave aspects, whilst in lues the tibia is straight and the sabering is due to new bone formation.

INFANTILE SCURVY

This results from a deficiency of vitamin C in the diet. It is nearly always seen in infants who have been fed on boiled cow's milk and who have not received orange or tomato juice. In many instances the diet has otherwise been quite good, although at times it may have been very deficient. The essential features as seen radiologically are due to the suppression of normal cellular activities, both productive and destructive whilst non-cellular activities such as the deposition of lime in the epiphyseal plate and internal resorption of the cortex and medulla are not interrupted. It is commonly diagnosed between the ages of seven and eleven months but occasionally may be found as early as six months and sometimes as late as two years.

The roentgenological changes are best seen in the long bones where growth is most rapid. There is accentuation of the white lines at the ends of the shafts of the bones, accentuation of the white lines around the epiphyseal centres and also thinning of the cortices, with general demineralization of the shafts—"ground glass" bones. These findings alone are not specific for scurvy, being also present in other conditions, but when subperiosteal cortical fractures occur near the ends of the bones, with adjacent defects in the cancellous structure, the so-called "corner sign" is present and the appearance is diagnostic. Later on there may be submetaphyseal rarefaction and also fragmentation of the zone of provisional calcification with lateral spur formation. An epiphyseal centre may be displaced by fracturing through the zone of provisional calcification or may be impacted into the brittle end of the shaft with resulting "cupping". Subperiosteal hæmorrhages often occur but are shown only as soft tissue swelling until healing commences. They may be small and inconspicuous or very large and completely envelop the involved bone, but they almost invariably end at the epiphyseal line where the periosteum is firmly attached. If a hæmorrhage is situated between two bones such as the tibia and fibula it may spread them apart.

The clinical improvement following the administration of vitamin C is most dramatic, so that

in a few days the infant seems well, but the bones improve more slowly. Gradually solidification occurs at the ends of the shafts, bony spurs unite and corner signs disappear. The shafts slowly become more normal in density and subperiosteal hæmorrhages, if present, organize and ossify and then gradually shrink. The new bone which forms at the end of the shaft after treatment, is normal, and the margin between this and the scorbutic portion of the shaft usually remains evident for some time. The old rarefied epiphyseal centres become buried in normal new bone but may be visible for years. If an epiphyseal centre becomes displaced, growth in length occurs from its new position and the shaft behind this adapts itself to the deformity so that there is rarely any serious after effect.

CÆLIAC DISEASE

Here there is general demineralization of the bones with accentuation of the white lines at the ends of the shafts and around the epiphyseal centres. However, there is no submetaphyseal rarefaction and corner signs, spurs and subperiosteal hæmorrhages are not present. In England it is likely to be associated with rickets, but in North America this seems rare.

CONGENITAL LUES

Not all luetic infants can be shown to have bony abnormalities at any one examination so it is never possible to exclude lues by radiographic means. On the other hand many new born infants with luetic mothers who have received treatment during pregnancy have positive Wassermann tests which later become negative. Whilst it is highly desirable to treat luetic infants as early in life as possible it is almost equally desirable not to treat non-luetic babies. Consequently, even though the Wassermann be positive, if there are no clinical signs of lues and the bones are normal most observers feel that treatment should be deferred for the time being.

The radiographic evidence of lues is most conclusive in the first few months of life when rickets and scurvy should cause no confusion. Characteristically multiple lesions are present, being roughly symmetrical on the two sides. Nearly all syphilitic infants have some disturbance of the white lines at the ends of the shafts of the long bones, but some of these changes are not at all specific for this condition. When

these lines are irregular — "saw tooth" — the evidence is more conclusive, but mere accentuation only means a constitutional disturbance. Broad zones of submetaphyseal rarefaction are also very suggestive and sometimes actual fracturing with displacement occurs through these rarefied zones. The most diagnostic sign of congenital lues is the appearance of bilateral symmetrical areas of osteomyelitis involving the upper medial aspects of the tibiae (Wimberger's sign). This is not osteomyelitis in the ordinary sense of the word but merely replacement of bone by luetic granulation tissue. Multiple areas of osteomyelitis may be present in the shafts of the long bones and even the shorter bones of the hands and feet may be involved. Subperiosteal new bone formation, often in onion skin layers may be very marked but at other times it is much more localized and in such cases it may be possible to see underlying small defects in the shaft. Examination of the skull may reveal multiple areas of bone destruction, simulating pyogenic osteomyelitis.

Healing occurs reasonably rapidly following antiluetic therapy, but if the bone changes are pronounced some abnormality usually persists for months.

INFANTILE PYOGENIC OSTEOMYELITIS

This is usually a relatively mild disease and is commonly due to the streptococcus. Operative measures are not often indicated as it responds well to the sulfonamides and penicillin. The great danger is damage to an adjacent epiphyseal line with subsequent disturbance of growth which may later cause marked deformity. The cortex of the bone is thin in infancy and consequently early rupture of the pus through the cortex and periosteum is frequent. Infection of an adjacent joint is not uncommon and may produce permanent damage. As with osteomyelitis in older individuals the bone changes do not appear for a week or ten days, but the soft tissue swelling may offer a clue and if a joint is involved, particularly the hip, widening of the joint space may be evident considerably sooner.

TUBERCULOSIS

Bone tuberculosis sometimes occurs during infancy and from the radiographic evidence alone particularly at a single examination it may be quite impossible to differentiate it from ordinary pyogenic osteomyelitis. The tuber-

culin test, if properly performed, is very seldom negative and positive chest findings will often be present. Usually the lesion tends to be destructive with less evidence of new bone formation than in septic osteomyelitis.

The shaft or the epiphysis or both may be involved; at other times the involvement is primarily in the joint. In the hip, narrowing of the joint space may be the first sign but in other joints the space is apt to remain of normal width for a considerable time, although marginal erosion of bone may take place. Narrowing of an intervertebral disc may be the first evidence of Pott's disease of the spine, but destruction of vertebrae usually follows soon and cold abscess formation is common. It should be emphasized that tuberculosis of the spine in infants and children is insidious and does not seem to cause much pain. Very often the deformity is extremely marked before the parents notice anything the matter with the infant.

Multiple lesions in the spine are also relatively frequent. The so-called cystic tuberculosis of the long bones may be quite silent and only discovered by routine examination of the bones. Tuberculous lesions of the hands and feet are relatively common.

SARCOIDOSIS

This is said to be very rare in infants and I have never recognized a case.

LEAD POISONING

Plumbism is not so uncommon as is sometimes supposed and if kept in mind will be easily diagnosed. It produces heavy transverse lines which are originally situated at the growing ends of the bones but which subsequently become left behind if growth continues and the lead intake stops. These lines tend to cause failure of tubulation. They are produced not by an excessive amount of lead in the bone but instead by excessively thick and closely packed spongiosa. If the intake continues slowly and for a long period of time the ends of the bones may present very wide dense transverse lines but when the intake is intermittent there may be zones of normal bone between zones of increased density. The costochondral junctions are involved but the changes here are not so well shown as at the ends of the long rapidly growing bones. However they are sometimes important, as lead poisoning may occasionally be

suspected from a radiograph of the chest. Other heavy metals, particularly bismuth and phosphorus will produce exactly similar lines.

OSTEOPETROSIS OR MARBLE BONES

This is a very rare condition, which appears to be congenital, in which the bones are very dense and also brittle. In some reported cases the density starts at the ends of the shafts and spreads up them whilst in others the density is central and the ends are of more normal density. Such bones show failure of constriction and are swollen in shape. The skull is also involved and narrowing of the basal foramina may produce blindness. The obliteration of the medullary cavities of the long bones produces anæmia with splenomegaly, etc.

CRETINISM

There is lack of bony growth and retarded development of the epiphyseal centres. There is also accentuation of the white lines at the ends of the shafts of the long bones similar to that seen in lead poisoning but the delayed ossification makes the differential diagnosis between the two conditions quite easy. Delayed ossification of the cranium may produce wide suture lines which simulate increased intracranial pressure but the small size of the skull and the large tongue will help distinguish between the two. Growth proceeds rapidly when thyroid is administered but if the intake is intermittent numerous transverse lines due to temporary cessation of growth may be seen. A year or so after the treatment is started, particularly if it has been active, the epiphyseal centres are often larger and more numerous than in the normal child.

OSTEOGENESIS IMPERFECTA

This term is used here to denote that condition in which multiple fractures occur before and after birth in distinction to fragilitas ossium which comes on later in life. These infants do not usually have blue sclera as do the cases of fragilitas ossium. However, both conditions are probably different manifestations of the same disease. The underlying defect seems to be diminished osteoblastic activity. The fractures heal fairly rapidly with callus formation and a second fracture rarely occurs at the same level. The long bones are fragile appearing and poorly ossified, and in the skull there is characteristically marked delay in ossification so that at birth

the cranium may consist merely of a membranous bag with a few small ossified centres.

SYMPATHETIC NEUROBLASTOMAS

Most of the metastatic bone tumours seen in infancy are due to this condition. The primary tumour is usually in the adrenal area and may be calcified. The metastases spread to the long bones and to the skull and they are often the first evidence of the disease. In the long bones the lesions tend to be symmetrical and are destructive although raised periosteum may be present. In the skull there is likely to be diffuse destruction and also separation of the sutures due to increased intracranial pressure.

LEUKÆMIA

Similar changes in the long bones may result from leukæmia but they seldom involve the skull.

ACHONDROPLASIA OR CHONDRODYSPLASIA FETALIS

This is a symmetrical disease of the skeleton which may be recognized at birth, in which longitudinal growth of the long bones is retarded whilst their diameters are approximately normal. The limbs are proportionally short but the trunk is not greatly deformed. In the hypoplastic type the tubular bones are short but they are otherwise relatively normal, although there is a tendency for some of the epiphyseal centres to be partly buried due to marginal overgrowth of the shaft around them. In the hyperplastic type the long bones are also short and there is marked flaring of the ends of the bones. The epiphyseal centres are small but otherwise fairly normal. The hands and feet are broad and stubby and the digits often present a trident deformity. Characteristically the base of the skull is shortened and the frontal bone projects forward giving an appearance of hydrocephalus.

MORQUIO'S DISEASE

A variant form of achondroplasia in which there is also shortening and deformity of the neck, trunk and thorax. Kyphosis is present and the vertebral bodies are malformed.

GARGOYLISM OR HURLER'S SYNDROME

This resembles Morquio's disease. In addition to many other features there may be clouding of the cornea. The changes in the long bones are said to be more marked in the arms than in the legs. The shafts of the long bones

of the arms are swollen in their mid portions and taper towards their ends.

HEREDITARY DEFORMING CHONDRODYSPLASIA OR MULTIPLE EXOSTOSES

This condition is hereditary in more than half of the cases. Not only are there exostoses present but there is often shortening of some of the bones, particularly the fibula and ulna, with resulting deformity of the wrist and ankle joints. Frequently the exostoses are larger around the knees, but they may arise almost anywhere in the body except the skull. In one case which we have followed the bones were normal at birth and almost normal at 12 months, although later in life typical marked deformities appeared. The father and several other members of the family were similarly affected. Growth of these exostoses tends to cease when the patient becomes full grown, but malignant degeneration occasionally develops later in life.

INFANTILE CORTICAL HYPEROSTOSES

This is a syndrome recently reported by Caffey of New York, possibly due to a virus infection or allergic reaction. The primary complaint of tender swelling occurs in the first few months of life and fever is usually present although there is comparatively little systemic upset. These swellings come on rapidly but subside slowly. There is no evidence of scurvy or lues. The skeletal changes involve multiple bones and consist of thickening of the cortex. In the lower extremities this thickening does not extend to the end of the shaft but in the upper extremity it may. There is quite often involvement of the clavicles and mandible. I am greatly indebted to Drs. Mac Edmison and Bruce Chown of the Children's Hospital in Winnipeg for allowing me to see the radiographs of a case that they have recently studied. Interestingly enough their infant came from the far North, where an unusual infectious process would seem unlikely.

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"Rien n'est plus clair que ce qu'on a trouvé hier, rien n'est plus difficile à voir que ce qu'on trouvera demain."—Darembert: *Etat des Sciences Médicales au XVIIe Siècle*.

PENICILLIN IN THE TREATMENT OF SINUSITIS*

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MOST of the organisms responsible for sinusitis belong to the penicillin-sensitive group, although some individual strains among these may be penicillin-resistant or may become so during the course of treatment. But penicillin in the treatment of sinusitis should be, on the face of it, curative in the great majority of cases. However, this is not so, for there are many factors which complicate the picture—factors which result from the peculiarities of nasal structure and function.

There are certain criteria for obtaining the maximum effect in the employment of any form of chemo- or bio-therapy. These are laid down by one well known authority, Dr. S. J. Crowe of Johns Hopkins Hospital, as follows: (1) all organisms, both aerobes and anaerobes, must be identified; (2) the bacteria must be sensitive to the drug or drugs used; (3) the drug must come in contact with the infecting organisms in the tissues in adequate concentration and over a sufficient period of time to allow complete bacteriocidal or bacteriostatic effect.

The above are general rules for this form of treatment, and there should be added another requirement in special reference to sinusitis: there must be adequate drainage or "ventilation". This applies to all forms of treatment of sinusitis, and is essential for proper chemotherapy also.

So much for the general remarks, and now to come to the particular. This is probably best taken up under the different headings for the various methods of administration of penicillin.

Parenteral administration.—This is usually in doses of 15-20,000 units at 3 to 4 hour intervals. Administered thus, penicillin produces very variable results, which on the whole are similar to what one has found with the sulfonamides. Occasionally results are very gratifying, but more commonly the disease is not greatly influenced, even when the dosage reaches astronomical figures. The prognosis is definitely much poorer in chronic sinusitis than it is in

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acute. A number of causes may be mentioned to account for this inconstancy, such as: (a) inadequate drainage with its resultant retention of the products of infection; and (b) inadequate concentration of the drug where it can reach the organisms, because of poor blood supply from oedema, pressure effects, permanent tissue changes in chronic conditions or because of the relatively poor blood supply of the mucous membrane of the sinuses.

When one considers the avascularity of the oedematous and polypoidal tissue which so frequently is met with in sinusitis, it is hard to imagine how penicillin could penetrate to the infecting organisms in sufficient concentration to have any great influence on the course of the disease. Conversely, it would seem highly probable that certain cases of sinusitis in the acute stage, and showing no such tissue changes, would be greatly and rapidly effected by penicillin given by injection.

There is one type of case in which this form of treatment alone does give remarkably good and constant results, and that is where the tissues beyond the confines of the sinuses have become involved, such as fractures into the sinuses from direct violence, and extension of infection, especially when it has involved the orbital tissues. In fact, in orbital cellulitis, the parenteral administration of penicillin seems to be the treatment par excellence, giving not only complete, but extremely rapid subsidence of the infection.

It has been repeatedly observed that if, as well as giving penicillin thus, any necessary operative procedure is carried out, the prospects of regression of the disease are much brighter. The operation may be quite a minor one, such as opening an infected bulla cell, making an antral window, or even no more than infraction of an obstructive middle turbinate. The secret of success in these instances is almost certainly due to adequate drainage.

While on the subject of parenteral administration of penicillin, one should mention that very similar results are being obtained by the oral administration of the calcium salt, given, of course, in larger doses.

Local application of penicillin.—How is the drug to be introduced into the sinuses? (a) **Spray technique.**—This is the simplest form of administration of penicillin solution into the nasal cavity, and it is chiefly for this reason

that it has been advocated so strongly by some. An ordinary atomizer may be used as well as various more complicated methods, which aim at introducing into the nose a mist much finer than can be obtained from an atomizer. These are said to have a curative effect on many cases of sinusitis, but it is hard to understand how the drug, under these circumstances, is able to enter the sinuses unless some form of alternating suction or pressure is also applied. It would seem likely that not a few of these cures were really cures of rhinitis rather than of sinusitis. (b) Direct instillation is a method which is commonly employed for introducing penicillin solution into both the maxillary and sphenoid sinuses, the technique being an every day procedure for the irrigation of these sinuses. But this brings up some specific questions, foremost among them being the strength of the solution to be used, and whether it should be the sodium or the calcium salt, etc.

Proetz has for years stressed the effect of nasal therapy upon ciliary action, and the great importance of maintaining it to the full whenever possible. He investigated the very question of the effects on ciliary action of penicillin solutions of varying strength, and came to the conclusion that a solution of the sodium salt up to 250 units per c.c. produced no slowing of ciliary action, but that when a strength of 500 units per c.c. was used this action was very slightly affected, and solutions stronger than this had increasingly deleterious effects upon the cilia. The majority of reports specify the use of penicillin solution of 250 U/c.c.

Proetz has shown how vitally important is unimpaired ciliary action, and consideration of this fact has materially affected practically all forms of modern intranasal therapy. Among other things we are urged to use no medication which is unduly alkaline, because, with increasing shift from the normal slightly acid to an alkaline nasal reaction, the cilia show increasing depression of function.

It is reported that penicillin solutions injected into the antrum will often clear up infection very rapidly. This is probably so, in that irrigations with common salt solution will frequently do the same thing. It makes one wonder if an accurate estimate has been made of the advantages of penicillin therapy. These are presumably cases in which the infection has not produced any great tissue changes, cases in which the infection has been more or less held

in check by the natural defences of the tissues, and the irrigations have turned the balance against the infection. It is hard to understand how a few c.c. of 250 units per c.c. of penicillin solution, which, after all, would remain in the sinus for a relatively short period, could clear up an infected antrum, unless this infection was very superficial. For penicillin used thus must penetrate the tissues to reach deeply buried organisms. To overcome this difficulty it has been advocated that a rubber catheter should be left in the antrum after making a small naso-antral window, and frequent instillations or irrigations done with a suitable solution of penicillin. Among those cases of maxillary and sphenoid sinusitis which do not respond to irrigation therapy, whether with or without the addition of penicillin instillation, there must be many in which the infection involves also one or more adjacent ethmoid cells. Thus, even if the treatment were capable of suppressing the infection in the sinus in question, yet it would still not eliminate the sinusitis, since an infective nidus would remain in the ethmoid.

(c) A further method of administration of penicillin, however, is capable of removing this difficulty, that is the use of *displacement technique*, as originally described by Proetz. The majority of reports on this form of treatment show favourable results with the penicillin solutions being used up to about 500 units per c.c. However, Smith and Tremble of Montreal feel that better results are obtained if solutions ten or more times that strength are used. They maintain further that using the sodium salt in strengths of between 5,000 and 10,000 U/c.c. in normal saline does not materially reduce ciliary activity. In one report they state that a 5 to 8% solution of cocaine is used as an anæsthetic and to shrink the nasal mucous membrane and that, if this should slightly slow ciliary function, this very slowing may be of some use in the retention of the solution in the sinuses. This is a very interesting observation.

The foregoing has hardly done more than discuss very briefly a few of the high lights of the question, and has left unmentioned a number of factors which have a considerable bearing on the problem under consideration. The outstanding one is, perhaps, that of allergy. But this in itself is such a large and controversial subject that one can do no more than mention it as a problem which has very definitely to be taken

into account in treating sinusitis, whether penicillin is used or not.

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RÉSUMÉ

Les voies d'administration et les diverses concentrations de la pénicilline sont discutées. Les traitements adjuvants, — notamment, chirurgicaux, — sont étudiés. L'attention est attirée sur l'importance de maintenir aussi intacte que possible l'action des vibrisses, de favoriser en tout temps le drainage et d'assurer une ventilation adéquate. On doit toujours penser aux manifestations allergiques qui orienteront le traitement dans une voie toute différente.

JEAN SAUCIER

THE TREATMENT OF MASTOIDITIS IN CHILDREN*

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IN the past ten years the medicinal treatment of mastoiditis in children has undergone many changes; but in a frank mastoidal infection we must still resort to surgery.

We live in an age of magic drugs. It was once hoped and expected that the use of these drugs would bring the day when mastoid operations would be rare. However, this has not become a fact, for helpful as the sulfonamides, penicillin and streptomycin have proved in the alleviation of human ills, we still must eventually take many cases of upper respiratory infection to the operating room for mastoidectomy.

MODE OF INVASION

It is difficult to separate infections of the middle ear from those of the mastoid cells. Clinically the disease is subdivided upon an arbitrary basis according to the focal manifestations present.

The centre of the pneumatic spaces of the ear is the antrum, the middle ear cells lying anteriorly, with the mastoid cells lying pos-

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teriorly. Ordinarily infection reaches the middle ear by way of the Eustachian tube. This is true of the otitis of scarlet fever, diphtheria, and of the influenzal infection, which sometimes appear in the mastoid process without first affecting the middle ear.

In nearly every case of acute infection of the middle ear, the mastoid cells, or antrum, are also involved. When interference with free drainage occurs mastoid symptoms become manifest. These are pressure from retention of the secretions in the cells, headache and localized pain.

SIGNS AND SYMPTOMS

The usual signs and symptoms of an acute mastoid infection are well known; pyrexia, pain, localized tenderness, aural discharge, sagging of the posterior external auditory wall, impaired hearing, infiltration under the skin over the mastoid process, perforation of the drum, leucocytosis, and finally the x-ray shows a degree of haziness to a pronounced resorption, as in the absence of cells, and a dense shadow. All these point to the presence of a mastoid abscess.

There is another class of patient in which these usual signs and symptoms are not seen. I refer to the child under 2 years of age. Recently the question of masked or latent mastoiditis has been revived. This infection some fifteen years ago was seriously considered as a factor in gastrointestinal infections. Operations in our hospital were done, as in many others. In some cases purulent discharge was found in the antrum, while in other cases the antrum contained nothing but air.

During the past few months we have again been confronted by an epidemic of gastrointestinal infections in babies under two years of age. The usual signs and symptoms of an infective diarrhoea are present. The patients in their disease follow the usual course of frequent liquid stools, dehydration, anorexia, nausea, emesis, pyrexia, and lassitude. There is a gradual and steady loss of weight. There is never any reference by the child to a condition of pain in the ears, no rubbing of the side of the head or crying with pain. Examination by x-ray is not conclusive.

In 1936 and 1937 we were faced with the same type of epidemic diarrhoea in babies. At that time I reported a series of 21 cases which had mastoid operations. Those earlier cases

are similar to these presenting themselves at this time.

All these present cases were admitted to the Infants Hospital for the treatment of an acute, subacute, or chronic diarrhoea primarily. Local signs of mastoiditis are lacking. The ear drum does not always show signs of an acute or subacute inflammation. Slight redness of the drum may be seen when the baby is not too dehydrated; but in those in whom dehydration is advanced the drum may present the same pallor as the other body tissues.

During these past two weeks 7 patients were operated on in the absence of any usual signs. These operations were a last resort. All operations were bilateral. All patients showed one or both antra filled with a mucopurulent, stringy, gelatinous secretion, and all produced staphylococci on culture.

A survey and otologic examination of all patients has been done in the Infants Hospital. The findings of the examination with special reference to the colour, consistency and markings of the drum have been recorded. Frequent examinations of these patients are done to ascertain if any changes are shown in the drum appearance. If these changes are considered to make us suspicious of a "masked" antral infection, the mastoid cavity is opened and the contents are cultured.

Staphylococci have been found to be present exclusively. This lowly staphylococcus has taken on a new rôle in its invasion process in spite of what is considered adequate treatment with sulfonamides and penicillin.

Patterson and Smith have now investigated and have analyzed 120 consecutive cases with the hope that these observations might be of value in reaching a solution to what is admittedly a difficult clinico-pathological problem. They have classified these cases into the following groups.

Group 1. Diarrhoea and vomiting, 49 cases, pus was found in the mastoids in 35.

Group 2. Respiratory conditions; of the 30 patients in this group pus was present in 17.

Group 3. Marasmus conditions; six of the 12 cases had pus in the mastoids.

Most of the cases had adequate courses of the sulfonamide drugs, but the course of the disease was unaffected. Otitis media was discovered in only 12 cases.

These men found that bacteria in mastoid pus are not of any characteristic group.

Pneumococci predominated in infants, followed by streptococci, staphylococci, *B. coli*, *B. proteus*, *M. catarrhalis*, etc., in decreasing ratio. We in Vancouver during the present epidemic, found staphylococci exclusively.

LABORATORY FINDINGS

The white cell count in uncomplicated mastoiditis is seldom high, usually between 12,000 and 20,000. If a high white count of 25,000 to 30,000 is found there may be other septic processes present. As a rule, an increase in leucocytes is accompanied by an increase in polymorphonuclear cells.

In ordinary otitic infections or uncomplicated mastoiditis, hæmoglobin and red cells are usually not affected. But a rapid decrease in hæmoglobin and red cells may indicate complications. Repeated examinations of the blood cells should be done if the course of the otitis is not progressing in the usual satisfactory manner.

X-RAYS

The x-ray picture is an important factor in deciding the future management of the patient and disease. In infants over one year of age, three degrees of mastoid disease may be seen by x-ray. (1) With infection and occlusion of the antrum the x-ray shows opaqueness of any cells, but the osseous structure and cell walls are still visible; (2) with additional softening the osseous structure and cell walls are no longer clearly visible; and, (3) with extensive mastoid destruction the sinus wall is visible when it should normally not be.

It has been found that when the x-ray shows active disease, following an otitis media, in that there is involvement of the cell structure and breaking down of bony cellular walls, the mastoid should be opened. The constitutional signs and symptoms may have abated and disappeared. The post-auricular swelling may have subsided, the discharge may have ceased from the middle ear, and the doctor may, therefore, be of the opinion that the mastoiditis has resolved, but if the x-ray shows definite erosion, the operation must be performed.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis in acute mastoiditis should be made from adenitis, furunculosis, and neuralgias. Pain, neuralgias or neuritis in or around the ear referred from other regions may be confusing. Eczema, erysipelas, malig-

nancy, perichondritis and trauma may also prove puzzling.

COMPLICATIONS

In early mastoidal infection the case must be closely supervised so that complications may not occur. These are not uncommon; of particular note are sinus thrombosis, pneumonia, meningitis and erysipelas.

TREATMENT

The treatment is twofold, medicinal and surgical. Of the medicines, sulfonamides are used nearly exclusively. It is usual that the prescribed sulfonamide given for the attack of influenza, and otitis media, is continued in use, for each drug has its characteristic value in limiting the growth of a particular organism. The method of administering the drug is by powder, tablet, or in an emulsion. The dosage recommended varies depending on signs and symptoms when the patient is first seen. One grain per pound of body weight in the first twenty-four hours, with reduction during the succeeding days to what is considered adequate, is the aim.

If at the expiration of seventy-two hours of medication the patient has not reacted satisfactorily in a reduction of the symptoms and signs, an x-ray picture is taken. If an amelioration of the signs and symptoms has been secured, and the patient's condition indicates that the acute process has subsided the patient is watched during the succeeding days.

It is at this time that the x-ray is of great value, in that a clearing of the haze and a better delineation of the trabeculae may warrant a stay in the surgical treatment. On the other hand, even though the patient seems to be on the road to recovery, if the mastoid cells are obliterated and the haziness is still present, it is imperative to open the mastoid.

It was considered in the early days of sulfonamide therapy that mastoid disease could almost be stopped by these drugs, and that by their universal use the infection of the mastoid cells could be "nipped in the bud". But the infection in the mastoid will not drain away. An abscess enclosed must be drained, in these cases by mastoidectomy.

There is no doubt but that mastoid operations are less frequent than formerly. To what is this due? Is it that the sulfonamides given early in influenzal infections and middle ear disease are a factor, or is it that the invading

micro-organisms in children's "colds", influenzal and other infectious conditions of the upper respiratory tract have been changed, or have been attenuated in growth? Thirty years ago pneumococci predominated, later streptococci, and more recently we find that staphylococci are playing a more important rôle.

There is a stage in the process of infection of the middle ear in which the causative organism may become so degenerated that the disease terminates as an otitis media. This is probably due to the sulfonamide which exerts a beneficial effect upon the tissues resisting invasion. Many cases which heretofore would, in all probability have continued to a frank mastoidal infection are now by sulfonamide therapy brought to a successful conclusion by being limited to an otitis media. Of the many sulfonamides administered by far the greatest amount used is in the form of sulfadiazine. The results obtained in the hands of the general practitioner using sulfadiazine show that a large percentage of influenzal infections are terminated before the infection has been established in the mastoid cells. This treatment, it is considered, has been a factor in reducing mastoid operations. It is true in Vancouver that mastoid operations have decreased to the point that they are now rare. The general practitioner having treated the child for a "cold", or a sore ear, it is only occasionally the otologist is called to a case presenting signs and symptoms of a mastoid disease.

In intracranial infections of staphylococcal and pneumococcal meningitis it has been found that sulfadiazine was of greater value than sulfathiazole. The former was present in the cerebrospinal fluid in greater concentration after oral administration than was the latter drug. A higher concentration of sulfadiazine in cerebrospinal fluid in pneumococcal meningitis is essential to recovery, than that necessary in staphylococcal infection.

Penicillin is effective if given early in a great percentage of cases of acute suppurative otitis media. The infection is cured and complications are prevented. Recently much study has been directed (Weinstein and Atherton) to evaluate the effective dosage of penicillin, to ascertain the length of time of treatment, and to determine whether or not there is any correlation between the total amount of penicillin required to produce good results and the

organism responsible for the infection. This has been accomplished by the study of x-ray examinations of the mastoid as a control.

Ten thousand units of penicillin were given intramuscularly every three hours over a period of days until the external auditory meatus was dry for at least 24 hours. In some cases the treatment was continued for several days after the discharge had ceased. No other treatment locally was done except wiping the canal dry with strips of gauze several times daily. The dosage of penicillin required ranged from 300,000 to 400,000 units given for an average time of four days, to as much as 1,500,000 units. Organisms found infecting the middle ear were mostly of the *Staph. aureus* group.

Examination of the aural canals and drums during the period of treatment showed a gradual decrease in the amount of purulent discharge, with lessening of bulging and redness of the drum. The temperature returned to normal rapidly. During the days of treatment with lessening of the purulent discharge it was noticed that this exudate was replaced by a mucoid material which continued for a varying number of days.

Repeated x-rays of the mastoids were done. No local signs of mastoiditis were found, such as œdema, localized tenderness, or swelling or sagging of the canal wall. A few showed a moderate degree of cellular destruction, while others on discharge from the hospital showed what appeared to be a regression of the infective process in the mastoid during the course of the penicillin treatment.

Weinstein and Atherton are of the opinion that in the series of cases of acute suppurative otitis media they treated with penicillin, the antibiotic agent is effective when Gram-positive cocci are the causative organisms. Complications are reduced to a minimum, and mastoiditis which was and is the commonest complication is reduced or almost eliminated.

Free and his co-workers gave oral doses of penicillin and measured the excretion of this agent in the urine. When they gave a dose of 10 gm. of soda bicarbonate, the total excretion of penicillin varied from 1,950 to 12,700 units. When no alkali was given the urinary excretion was 8,800 to 33,600 units.

Intramuscular administration of penicillin is preferable to intravenous therapy. Soon after it reaches the blood it disappears very rapidly.

If a dose of 10,000 units is given intravenously, a more than adequate blood concentration for most infections is found immediately after the injection and a less than adequate concentration about 30 minutes later. When it is given intramuscularly, absorption requires some time and a moderate, but perhaps adequate, blood concentration may last for three hours.

SURGERY

When the time has arrived to put away our chemotherapeutic measures and the decision has been made to perform a mastoid operation there are two operative methods which it is necessary to consider. The time-honoured operation on the mastoid which still has its followers is to suture the periosteum and the skin, leaving in a drain, either a rubber tube or a length of gauze. During the past few years another method of closure has been advocated, that is to close the wound completely. These two methods are both good, and it has been found that at times the first may successfully be done, while again the second type of operation may be preferred.

With the advent of chemotherapy and its proved efficacy in treating infections, the possibilities of a primary suture, with the inclusion of one of the sulfonamide drugs in the mastoid cavity, have been realized by the profession. If wounds can be closed completely at the time of operation the risk of postoperative infections is limited, the stay in hospital is shortened, and the necessity for prolonged dressings is eliminated.

Since penicillin has become more available, and as it is the most effective antibiotic agent known, we have turned to its local and general administration with the hope that the performance of the primary suture will be the accepted method.

Sulfonamides introduced into the mastoid cavity with primary suture are not without risk and danger from the not infrequent side effects. Penicillin has many advantages over the sulfonamides, not the least of which is that to all intents and purposes it is without dangerous side effects. It would seem the ideal agent to use in the treatment of mastoid infections due to Gram-positive cocci. The method of the local administration of the penicillin is through a ureteral catheter of a No. 4 or No. 5 size. The dosage 10,000 units every eight hours for four days.

The treatment of mastoiditis in children is, therefore, a prolonged, early acquaintance with the primary infections of the upper respiratory tract through the several manifestations of disease in the nose, the pharynx, the Eustachian tube, the middle ear, to the mastoid bone. The treatment of this respiratory infection if commenced early may be localized and stopped before it has invaded the mastoid cells. But if the treatment has not been adequate, then we are faced with the necessity of performing a mastoid operation.

The choice of the operative procedure is left with the surgeon. In infants he may leave the cavity open without suturing; in older children he may use interrupted sutures with drainage, or he may adopt a rapidly becoming universal technique of complete closure of the wound, with or without the secondary administration of penicillin therapy.

In conclusion, our study of mastoiditis leaves us with the thought that in an age of wonder-working drugs the surgeon has not been displaced. His skill must still be called upon to save life when infection of the mastoid area cannot be terminated by therapeutic measures.

RÉSUMÉ

On tend de plus en plus à fermer la plaie mastoïdienne, soit complètement, soit incomplètement afin de permettre l'instillation locale d'une solution de pénicilline. Celle-ci semble préférable à la sulfamidothérapie locale. Il va sans dire, toutefois, que la procédure variera selon les cas particuliers. Chez le nourrisson, il vaut mieux laisser la cavité ouverte alors que chez l'enfant, ou bien on fermera complètement, ou bien, on fera des points séparés avec drainage et au besoin, instillation de pénicilline. En somme, l'avènement des antibiotiques n'a pas remplacé la chirurgie; elle n'a que modifié ses modalités d'application.

JEAN SAUCIER

The value of good posture can hardly be overestimated. It is, however, something that can only be attained as a by-product of healthful, well balanced living. The savage has it; the wild animal has it; the healthy child has it. Like character, to which it is closely related, it is attained by indirect means—attention to nutrition, vision and general physical development. It is an aggressive thing rather than a passive; it is dynamic rather than static, a living pulsating condition rather than a frozen, stiff state; it is grace and efficiency rather than pose; it is an unconscious adaptation to surrounding conditions rather than a studied attempt to appear handsome.—Dr. Thurman B. Rice in *Hygeia*.

THE PSYCHOLOGICAL COMPONENT

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[I]t is most probable that all physical illness is apprehended at some level of consciousness, and all psychic activity is accompanied by some biochemical changes. Thus, in the widest sense, every patient is a psychosomatic problem and reacts with both somatic and psychologic manifestations, the resultant interplay of these factors consistently altering the course of his illness. Recent statistics compiled by Weiss and English¹ point out that of all patients seen by the average physician, a third are suffering from psychogenic or "functional" disorders; that is, they have no bodily disease to account for their illness. And approximately another third have varying degrees of actual organic pathology which is accentuated, distorted and perpetuated by emotional factors.

MILITARY OBSERVATIONS

These figures were well substantiated during the war when it was possible to observe and study large groups of men whose reactions were sharply focussed against the background of military regimentation and discipline. For example, in a survey at an advanced training centre on the East Coast, it was determined that, roughly, 40 to 60% of the daily sick parade were psychosomatic problems. In a later review of 2,500 cases referred for psychiatric consultation, it was possible to extract more pertinent and detailed information. In the majority of cases it was easily observed that, regardless of their clinical symptomatology, the underlying basis was usually an unconscious struggle between the demands of their basic instincts and emotional drives, and those inculcated by their military environment and training.

These men, on the basis of their battle exposure, were categorized into three broad groups, as follows: Group 1—prolonged, usually intensive exposure. Group 2—mild to moderate exposure, usually of limited duration. Group 3—pre-combat levels.

In group 1, which contained about 10% of all cases, the situation was merely that of a normal man in an abnormal environment, who reacted normally and usually adjusted well up

to a point where no one could be expected to endure more. Such men are certainly neither weak nor failures because they developed some anxiety symptoms. Into group 2 fell approximately 25% of the cases, and inquiry here indicated that these men, by and large, were vulnerable and predisposed personalities. Their past history was indicative of mild neuropathic tendencies and insecurity features, and they had, in the vernacular, two strikes against them before they ever entered into battle. However, it is significant that over 60% of the psychiatric cases were found to belong in group 3. These were men who had never been exposed to battle, but had been detected at reception centres, training camps, and base units overseas. Into this group fell the cases of ill-defined neurotic and psychosomatic complaints, psychopathic traits, and many cases very suggestive of malingering. Examination, again, usually revealed the existence of these tendencies prior to the army, with an obvious history of inadequacy, selfish behaviour, emotional instability, and lack of social responsiveness. To argue whether or not these men are sick, serves little useful purpose. Even with the recognition of a large element of malingering, from the broad point of view they must be regarded as "sick".

INTERPRETATION OF FINDINGS

Although the findings in themselves are of great value, it is the underlying significance that is of greater importance. As Chisholm² has pointed out, we have laid great stress on personal safety for many years. We have all been trained to repress aggression, to believe that it is wrong to hurt others. With the advent of war, our soldiers, loaded with these principles, were suddenly expected to risk their lives and kill other men freely. As was to be expected, this violation of their conscience values resulted in feelings of guilt and fear. Now fear has also been disapproved of by parents and tabooed in childhood. Thus, to our soldiers, fear was experienced as a shameful thing and hence there occurred repression of fear. This produced increasing tension and, at the individual tolerance threshold, the soldier broke down. That is, fear took charge of his behaviour and served to remove him from an intolerable situation. These men were unable to cope with the effects of large volumes of inexperienced fear which was carried below

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the level of consciousness. They had not been taught that fear is respectable and should be "recognized as a benign, protective mechanism which prepares the organism for supreme effort".

In addition to aggression, fear, and their repression, other factors are responsible for the large number of psychiatric cases, particularly those detected at pre-combat levels. As Strecker³ in evaluating our democratic way of life, has pertinently remarked, in a true democracy there are not only rights and privileges, but duties and obligations. Our military experience, he states, has shown little evidence of intellectual inferiority, but rather widespread emotional immaturity and social irresponsibility. He feels this is a result of faulty childhood training—our failure to instil a reasonable amount of social responsibility, to develop the habit of contributing to the social welfare of family and community. It is concluded therefore, since these lesions are impressed mainly by example, that too many adults responsible for the training and development of children are themselves immature and basically undemocratic in their attitudes and behaviour. Strecker feels that this trend is both dangerous and important, for he states, "unsolved, it will threaten the security of our democratic civilization".

CIVILIAN OBSERVATIONS

In civil life there is much evidence of this emotional and social immaturity, of this inability to cope with difficult situations and adjust satisfactorily to the stress and strain of life. We have all seen those personalities who tend to make the most of illness, who react to difficulties with marked somatic dysfunction and cling tenaciously to their symptoms. These people, by and large emotionally immature and unstable, tend to over-react to environmental stress with anxiety and hysterical features, and may even regress to infantile forms of behaviour. It is important to realize that such common complaints as anorexia, nausea, vomiting, dyspepsia, constipation, diarrhoea or incontinence may well be adult manifestations of the "organ language of childhood", so well described by Weiss and English.¹ Also, that a large percentage of our migrainoid, anginoid and hypertensive cases, people ill for years with their "sick headaches", insomnia, dyspnoea, palpitations and submammary pain are

actually suffering from nothing more organic than a chronic anxiety neurosis. As Fetterman⁴ has so aptly remarked, "It is the personality of the patient, including his intelligence, his dynamic energy and his pattern of behaviour, that is so highly important in all consideration of disease. For the personality is like a prism between pathologic changes and symptoms, capable of enlarging or of eliminating them".

(a) *Iatrogenic (Gr. iatros, doctor) diseases.*—

These form a frequently encountered group which has been well described by Gillespie.⁵ They are psychologically produced syndromes initiated by ill-considered, vague diagnoses and even uncertain attitudes on the part of medical men to susceptible patients, without explanation, and often without necessity. Oille⁶ has stated that "almost 60% of all patients who consult a cardiac specialist are suffering from either an exaggerated or wholly unnecessary anxiety state about their hearts, arising from suggestion and not based on reason". We have all seen these patients doomed, as it were, to years of semi-invalidism because they were told they had a "weak, leaking or enlarged heart", a "fallen bowel" or "dropped kidney".

In the army it was both surprising and distressing to find the large number of healthy men with fixed ideas of somatic disease in the absence of any clinical findings. A few years ago, a group of more than 500 recruits were chosen at random at one of our largest reception centres. They were given a questionnaire to fill out which asked, among other points, "Are you suffering from heart disease?" The resultant figures were quite startling and indicated that almost 30% believed, or claimed to believe, that they had "heart trouble". Almost without exception they revealed the fact that their family or school physician had diagnosed the organic disorder. In addition, they were quite surprised, usually skeptical, and often hostile, when informed that their physical examinations were negative. It may be true that a certain percentage of these patients are so hypersensitive and predisposed that it but requires a slight impetus, such as the careless, ill-timed remark of a doctor, to set off a train of distressing events. However, a large number do not, and need never, fall into this category, and could be spared months and years of anguish by a few simple, well-chosen sentences from the doctor. Even if sufficiently

unfortunate to be started on this psychological road to illness, the majority could be easily detoured by early, competent treatment.

Many of our foremost medical men, realizing the importance of these facts, have repeatedly emphasized them in their writings. Alvarez,⁷ one of the pioneers in this field, recently stressed the point that every doctor has to be "a psychiatrist of sorts". He has pointed out that the average physician dislikes spending time with neurotic people, endeavouring to teach them a more sensible way of life. However, he feels that, if we are to help them at all, we must make these efforts. And if we are to avoid much needless surgery and incorrect, frightening diagnoses, we must become expert at recognizing the clinical manifestations of hysteria, anxiety, hypochondriasis and mild forms of insanity. Persons with the early symptoms of these conditions rarely go to a psychiatrist; rather do they visit an internist, cardiologist or gastroenterologist. Therefore, it behooves the average medical practitioner to prepare himself to care for these people in an intelligent and competent fashion.

(b) *Prevalent misconceptions.*—There is a widespread misunderstanding concerning the significance of such terms as "psychoneurosis" and "emotional instability" that must be eliminated. It must be honestly realized that we all have an inherent distrust and aversion for the "insane"; and because psychiatry is so commonly identified with the mentally unbalanced and disordered, we have bedecked it with all the ancient fears, superstitions and taboos. Psychiatric methods often seem superficially incomprehensible and mysterious: even to many doctors the interpretation of illness, by means of actions and reactions, seems an intangible diagnostic procedure. Yet we all indulge in this practice every day; we all judge others by their behaviour and its deviation from the so-called norm. How often have we made such remarks as, "George is a queer one", or "Henry is always so worried about his health", and given no further thought to the subject. But let George or Henry visit a psychiatrist and the entire complexion of things will change. He is immediately labelled with a name that the public associates with weakness or defect, and he may be forever branded with the stigma of mental disease. Actually, the psychiatrist has probably agreed with our diagnosis, but he calls it a functional disorder

or neurosis which, for him, does not even imply insanity. But, too often, the damage is already done!

The general public must be educated; they must be taught certain basic facts and be made to understand the power of, and the rôle played by, the emotions in our everyday life. As Chisholm⁸ has clearly stated, "even though man is a thinking creature, his conduct is not regulated by rational thought, but rather by the driving power of his instincts and emotions". These drives have been fashioned in infancy and early childhood, and their pattern may be followed in all later experiences. Throughout life we strive for health, happiness and esteem but, too often, do we experience pain, frustration and derision. It is on the basis of these early emotional patterns that our reactions to disease, distress and defeat are determined.

Therefore, the layman must learn to appreciate that, as the result of environmental demands or desires in opposition to this basic pattern, there develop emotional conflicts located, mainly, in the unconscious mind. Consequently he is, to a great extent, unaware of their existence. Furthermore, conflict always engenders tension which, if the particular precipitating problem is not satisfactorily solved, tends to overflow. This occurs after a certain period of time and over a certain level which varies with the individual. Over this individual tolerance threshold, the tension may express itself in many ways, commonly as anxiety manifestations with somatic reference, the latter usually gastric or cardiac in nature. It is of these that the patient becomes unpleasantly aware and, not appreciating the underlying processes, believes he is physically ill. This additional concern causes more tension which is added to that already present due to the primary problem, hence we have an intensification of the symptomatology and the production of a vicious cycle. It is obvious that good medical management can easily dispel this added tension and anxiety, whereas inadequate therapy may well serve to fix and perpetuate the symptoms and distress. In addition, the doctor, by properly evaluating the patient as a psychobiological unit, may be able to discover the true nature of the condition, and aid him in its solution.

(c) *Common medical attitudes.*—Many physicians, however, exhibit marked lack of under-

standing in the handling of psychogenic and psychosomatic conditions, and would appear to have little sympathy for such patients. They are classed as "neurotics"; unconsciously looked down on as inadequate personalities, inferior by nature, for whom little or nothing can be done. This prevalent attitude exists primarily because so many men, neither appreciating psychological mechanisms nor their treatment, have a biased outlook and remain fettered by the bonds of mediæval misconception and ignorance.

Too many practitioners, having made a "snap diagnosis" that the patient is a confirmed neurotic and cannot be helped, usually react in either of two ways. They may humour the patient along, often acceding to demands for medicines or surgical intervention, thereby unintentionally cementing his conviction of organic disease. Alternatively, they may attempt to rid themselves of the case, brushing aside all complaints and scoffing heartily at the thought of any disease process with such familiar advice as, "You're just a little nervous, take a short vacation and you'll feel fine in no time". One cannot "go away and rest" and leave one's emotional state behind. A patient will remain emotionally upset (and physically distressed) until some way out of his difficulties is found.

Most patients react negatively when told their complaints are "imaginary" or "in their mind", and tend to struggle all the more strenuously to prove how sick they really are. They find themselves in a more intense conflict with the situation that is primarily distressing them, and become locked in an almost never-ending campaign to put across their illness. Under such circumstances, treatment is extremely difficult and often futile.

PSYCHOTHERAPY

The subject of psychological treatment is too large to be discussed in this paper, but a few general points will be briefly mentioned.

Treatment, broadly speaking, has three practical goals: (1) to deal with the signs and symptoms and bring about a return to the conditions prior to the illness; (2) to re-adapt the patient to a socially valuable life; and (3) to so arrange his future, if possible, that strains which are, for him, intolerable, will not have to be endured again. But, for too many years, disease has been considered as only a disorder

of organs and cells. Subsequently, there evolved the specialist with his numerous complex and precise instruments. Although effecting much progress, this organic phase of machines and specialists has definitely limited the scope, knowledge and interest of the individual and markedly depersonalized the doctor-patient relationship. There are only too many patients who have made the medical rounds with little resultant improvement in their health. They have been repeatedly assaulted by batteries of tests, and thereafter informed by each man. "There is nothing wrong with your stomach (or heart, as the case may be) Mr. Jones, you are just a little run down". Mr. Jones is delighted to know that all his organs are functioning perfectly, but is still puzzled as to why he feels so miserable, has little appetite, is losing weight, strength, sleep, and, in general, his zest for life. The answer, in view of the foregoing, is distressingly obvious to all.

(a) *Main types of psychotherapy.* — As Grinker⁸ has so well described, psychotherapy can be divided into two main types, the suppressive and the expressive. Broadly speaking, the main principles of each are as follows: (1) The suppressive type of therapy is useful, mainly in the early mild conditions. It consists, basically, of strong persuasion, urging the patient to control himself, to suppress asocial and worrisome thoughts or wishes, and to find an interest or inspiration in life, work, the community, religion, etc. (2) The expressive type of treatment, used in the more severe and deeply rooted personality disturbances, is more analytic in approach. It urges the loosening of repression, plus the conscious recognition and analysis of unconscious asocial wishes, with the resultant freedom of energy bound in needless repression. Actually most, if not all, psychotherapy contains some elements of both these types. This is well demonstrated in the modern group psychotherapeutic methods which were so effective during the war, and whose application in times of peace should prove so very successful.

(b) *Group treatment.* — In the early years of this century, Pratt⁹ originated the idea of group psychotherapy, primarily as a time-saving device. He soon recognized the importance of the emotional lift obtained by his patients, their encouragement at seeing the progress of other patients, and their efforts

to compete with each other therapeutically. His first group consisted of tubercular cases. Since then, numerous other groups have been successfully treated, including diabetic, cardiac, hypertensive and peptic ulcer cases. Pratt's methods are based mainly on suppressive principles with such analysis as there is being on a very superficial level. He also has stressed the fact that in the treatment of the simpler neuroses and many psychosomatic conditions, one does not have to be a psychiatrist.

Wender¹⁰ has also emphasized the effectiveness of group interaction as a basic medium for the release of unconscious emotional difficulties. He states that "man is a group animal . . . (he) is a social product and his inhibitions and repressions are motivated by the mores of the group . . . his difficulties in adjustment and failure to express his emotional troubles are the result of his inability to face the group and find his place in it . . . and his failure to achieve this adaptation produces a neurosis or psychosis". He suggests that the placement of the individual, who has failed to adapt well to the stress and strain of life, in a small group of friendly disposition and composed of those with similar disorders is most helpful. It will enable him—when he learns to appreciate and comprehend the problems of others—to associate himself with them and release his emotional drives of aggression, hate, love, desire, without concomitant sense of guilt. Thus, by understanding and overcoming his difficulties, and making good adjustment in the small group, he will be better equipped to face the world and handle his emotional problems, social and otherwise, on a satisfactory basis.

This mode of therapy was widely, and apparently effectively, used by our American allies, especially during the later stages of the war. The program usually consisted of a series of short, informal discussion periods with the emphasis being placed on the functional nature of the symptomatology. In these classes an attempt was made: (1) to reduce the various complaints to a common source; (2) to describe, in an elementary fashion, the anatomy and physiology of the central nervous system, aided by simple diagrams illustrating the correlation of the nervous system and the viscera, glands and emotions, as well as their reaction to various environmental changes; (3) to explain, in simple terms, the concepts of the

unconscious, the instinct of self-preservation, the social drive, and the conditioned reflex; (4) to clarify the basic conflict between the sense of duty and the desire to escape danger and death; (5) to explain the symptomatology as manifestations of overwhelming fear in the presence of great danger; (6) to reassure the patient that with the elimination of the precipitating factors the symptoms will invariably, though gradually, disappear; (7) to restore and rebuild morale, and to cultivate a sense of social responsibility.

These group sessions were supplemented by any required individual therapy, and also aided by occupational and educational therapy.

(c) *Surgical application.*—It is quite obvious that the best fitting prosthetic appliance or plastic device is of little value if the patient is not psychologically prepared for its use. For such patients, the hospital is a world of unreality, where they are attended to and cared for, in contrast to the outside world where one swims or sinks. Although they should not be pampered, it is evident that they should be prepared for their new environment, so much changed because of their injury.

Much more applicable to civilian practice is the frequency with which extensive and repeated investigations, and often lengthy and fruitless courses of treatment, have been directed towards ill-defined organic conditions. These diseases often have proved to be psychogenic or psychosomatic in nature on the later taking of a psychiatric case history.

It would appear both logical and important, therefore: (1) To always assess the personality prior to elective surgery. Our high-grade feeble-minded, and those neurotically predisposed, are very susceptible to hysterical sequelæ, especially with spinal anaesthesia. Thus great care should be taken in what one says to, and in front of, these patients, for misinterpretation at this time of increased suggestibility may well precipitate, perpetuate, or fix neurotic reactions. (2) To prepare psychologically all surgical patients with a simple, clear and reassuring statement of the current situation. An explanation given of what is going to be done, and what result can be expected. Experience has shown that surgical intervention may be the beginning of years of neurosis much more disabling than the condition it set out to relieve, which could have been avoided by simple explanation and reassurance.

CONCLUSION

Psychological factors play a vital rôle in all illness and disease. This fact, though basically old and familiar, was repeatedly brought to our attention during the war, and its application is even more important during times of peace. Education of the public and eradication of prevalent fallacies concerning psychiatry are urgently required, with similar attention being directed towards current medical misconceptions and resultant mismanagement. We cannot overstress the necessity for the widespread appreciation of all patients as psychological units—for the evaluation and treatment “of the patient, not merely the disease”.

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RÉSUMÉ

Autre important article à propos de la médecine psycho-somatique. Brève mise au point de la question. Ne jamais perdre de vue que l'homme est une unité psychobiologique et que les facteurs psychologiques jouent un rôle énorme dans l'éclosion des maladies. La guerre a démontré la réalité et la fréquence des facteurs psychologiques en même temps qu'elle a permis l'organisation du traitement, collectif et individuel. Le public doit être éduqué et renseigné sur cette question afin que disparaissent les préjugés qui entourent la psychiatrie. Le médecin lui-même devra apprendre à faire de la psychiatrie préventive et à diriger ses névropathes confirmés sur une institution de psychothérapie. Traiter et connaître le malade est de la meilleure médecine que faire un diagnostic et instituer le traitement d'une maladie.

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Science, then, can help to stimulate the intellect and to discipline the will. To this extent it has bearings on the good life. But it cannot do this work alone: it must take its proper place in a liberal education and an open culture. The right use of science as a school of rational life depends on its being set in a matrix of other studies and other activities. Science by itself throws no light on its own value, nor on values in general. It is not a royal road to knowledge of every kind.—E. F. Caldin.

VERTIGO*

T. J. Haughton, M.D.

Regina, Sask.

THE complaint of dizziness is one of the most common in clinical practice and while it is often a secondary symptom it may be the only one or the most troublesome, and as such may require much study to elicit the cause.

It soon becomes apparent however, that the meaning of dizziness varies with the individual. Frequently, when he presents himself, the attack is past and the symptom is described in retrospect. Moreover, since it is of such a subjective nature it requires careful inquiry on the part of the physician to determine the exact nature of the sensation. Thus we find complaints of weakness, faintness, giddiness, light-headedness, reeling or swimming of the head. Others describe sensations of the sinking of the floor or ground beneath them, others of erect objects becoming inclined. I propose to deal only with what we know as true vertigo.

True vertigo is the subjective symptom of equilibrium disturbance, a disturbance in the normal relationship of an individual to his surroundings. He feels that either he is moving in relation to the objects around him or that these objects are moving about him. It always implies a sense of motion and is usually rotatory.

Balance in the upright position is maintained by three mechanisms: (1) the superficial and deep sensations from skin, muscle tendons and joints; (2) visual impressions; and (3) the vestibular apparatus of the inner ear.

In disturbances of deep sensibility as typically produced by tabes where afferent impulses from skin, joints and muscles are interfered with, through degeneration of the posterior columns, there may be unsteadiness in walking or actual falling when the eyes are closed. This is often termed “dizziness” by the patient. The nature of the condition is recognized by the presence of other clinical findings, such as disturbances of co-ordination, absent deep tendon reflexes, spinal fluid changes and other manifestations of syphilis. It is possible however, that the disease may have affected the eighth nerve or its pathways, in which case true vertigo will result.

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Ocular vertigo may arise from diplopia due to extra-ocular palsies, muscle imbalance or errors of refraction. It is more pronounced on looking towards the side of the affected muscle and disappears on closing the eyes. The vertigo experienced on looking from a height is partly ocular, largely psychogenic. It is usually a feeling of uncertainty, anxiety, or giddiness. It involves no real pattern of motion.

The vertigo produced by inner ear disturbances is typically rotational in character. Experimental stimulation of the normal labyrinth will produce the same sensations as in disease. As pointed out by Brunner,¹ only vertigo of the type which can be induced by the usual clinical methods of examining the labyrinth can be considered as labyrinthine.

ETIOLOGY

The most important of the three mechanisms of equilibrium is the vestibular system. Any factor causing either irritation or destruction of any portion of this system may bring about true vertigo.

The vestibule and semicircular canals together with the cochlea make up the inner ear. Some authors speak of the entire internal ear as the labyrinth, while others think only of the vestibule and semicircular canals as such. The nerve fibres arising from the macula of the vestibule and the crista of the ampullæ of the semicircular canals have their trophic centre in the vestibular ganglion. The primary neurons from this ganglion end centrally in the several vestibular nuclei. These nuclei have their afferent and efferent connections with the brain and spinal cord. The whole structure, semicircular canals, vestibule, vestibular portion of the eighth nerve and its central pathways constitute the labyrinthine system. In passing it is well to note that because of its intimate anatomical relation with the cochlea, any disturbance of that portion of the vestibular system contained in the inner ear may, and usually does, cause acoustic symptoms.

In diseases of the vestibular system vertigo may be the only symptom, but as the disease persists or increases in severity, it always becomes associated with other subjective and objective manifestations. Brunner,¹ in recent papers has emphasized the fact that in a typical labyrinthine seizure some degree of auditory impairment is always present. It is pointed out, however, that several years may elapse

between the first attack of vertigo and the onset of auditory disturbances. The deafness varies in intensity from time to time and usually involves the entire hearing range. Audiometric tests show the impairment to be a nerve type. The tinnitus may be of a double nature; a high-pitched continuous sound present at all times, and a secondary pounding or roaring type becoming worse when paroxysms occur.

When severe labyrinthine attacks of vertigo occur some degree of nystagmus is usually present. It is of the horizontal-rotatory type with the quick component directed to the unaffected ear. It may range from the first to the third degree of intensity. The vertigo present in labyrinthine disease always shows some relation to the associated nystagmus. Vertigo is often present without nystagmus, but if labyrinthine nystagmus is found, some degree of rotational vertigo is experienced.

Systemic disease, aural disease, or disease of the central nervous system may produce rotational vertigo. True vertigo may arise in many systemic diseases. In recent years much investigation has been done and much written on the labyrinthine symptom-complex known as Ménière's disease. This is a clear-cut picture of rotational vertigo with nausea or vomiting, nystagmus, tinnitus and hearing impairment, appearing in paroxysmal attacks, I have been interested in the case that presents, not necessarily the complete picture of labyrinthine dysfunction, but rather the type manifesting the earliest symptom of irritation, a dizziness, which without any prompting on the part of the physician is described as a "turning" or a definite pulsion to one side or the other. Often there is no nystagmus.

Audiometric tests in these cases show little or no hearing loss, or at least equal diminution in both ears, that may have preceded the complaint. Caloric tests are either normal, slightly hypo- or hyper-active, and are usually equal in response in both ears. The attacks do not appear in paroxysms, are usually constant for days, weeks or months with slight remissions and exacerbations. The symptom may arise from general systemic disease affecting the blood supply to the labyrinth, such as arteriosclerosis, cardiac disease, hypertension, the anæmias and other blood dyscrasias.

Undoubtedly arteriosclerotic changes play a big part. Many patients with these labyrinthine symptoms are in their fourth to sixth

CONCLUSION

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When severe labyrinthine attacks of vertigo occur some degree of nystagmus is usually present. It is of the horizontal-rotatory type with the quick component directed to the unaffected ear. It may range from the first to the third degree of intensity. The vertigo present in labyrinthine disease always shows some relation to the associated nystagmus. Vertigo is often present without nystagmus, but if labyrinthine nystagmus is found, some degree of rotational vertigo is experienced.

Systemic disease, aural disease, or disease of the central nervous system may produce rotational vertigo. True vertigo may arise in many systemic diseases. In recent years much investigation has been done and much written on the labyrinthine symptom-complex known as Ménière's disease. This is a clear-cut picture of rotational vertigo with nausea or vomiting, nystagmus, tinnitus and hearing impairment, appearing in paroxysmal attacks, I have been interested in the case that presents, not necessarily the complete picture of labyrinthine dysfunction, but rather the type manifesting the earliest symptom of irritation, a dizziness, which without any prompting on the part of the physician is described as a "turning" or a definite pulsion to one side or the other. Often there is no nystagmus.

Audiometric tests in these cases show little or no hearing loss, or at least equal diminution in both ears, that may have preceded the complaint. Caloric tests are either normal, slightly hypo- or hyper-active, and are usually equal in response in both ears. The attacks do not appear in paroxysms, are usually constant for days, weeks or months with slight remissions and exacerbations. The symptom may arise from general systemic disease affecting the blood supply to the labyrinth, such as arteriosclerosis, cardiac disease, hypertension, the anæmias and other blood dyscrasias.

Undoubtedly arteriosclerotic changes play a big part. Many patients with these labyrinthine symptoms are in their fourth to sixth

decade. In 94 cases collected by Franke, Hockwart and Brunner, the first attack was noted in the fifth decade or later in 51 cases, and in the fourth decade in 25. These authors stress the fact that arteriosclerotic changes can be found often in the internal carotid and vertebral artery, as early as the second decade of life, and are always found after the fourth. They further state that though arteriosclerotic changes in the internal auditory artery are usually not seen, the flow of blood in this vessel is disturbed if there are organic changes in the basal or vertebral vessels. This abnormal flow in turn stimulates an abnormal vasomotor reaction of the blood vessels of the labyrinth. When arteriosclerosis can be detected in the peripheral vessels this may well be assumed. However, when no such change can be noted even in the eyegrounds, the diagnosis is difficult. A slowly progressive interference with labyrinthine function theoretically could be the earliest symptom of cerebral arteriosclerosis. Many authors stress the importance of an unstable vasomotor system in the production of labyrinthine vertigo.

Kobrak² suggests that changes in the labyrinth are brought about by an increased permeability of the labyrinthine vessels and of the choroid plexus, due to an abnormally labile vegetative nervous system. Most investigators now agree that the vasomotor or angioneurotic factor plays the chief rôle in non-suppurative labyrinthine disturbances.

Atkinson³ explains the Ménière symptom complex entirely on a vasomotor hypothesis and consequently divides his cases into vasodilator and vasoconstrictor groups. His treatment is based on such a differentiation.

Mogan and Baumgartner⁴ develop the vascular theory still further. They consider that any foreign or even emotional disturbance through irritation of the vasoconstrictor fibres of the internal auditory artery may cause vasospasm and hence hydrolabyrinth. They cite a case with arrest of hearing loss and complete disappearance of vertigo following cervical ganglionectomy.

Spiegel⁵ also observed that stimulation of the cervical sympathetic nerve influenced the state of contraction of the labyrinthine vessels. The occasional Ménière-like attacks associated with migraine, which is now generally assumed to be a vasomotor disturbance, supports this view.

Leidler⁶ explains the vertigo and acoustic symptoms found in neurotic cases on the basis of vasomotor changes resulting in spasm and abnormal permeability of the labyrinthine vessels.

Closely allied to these vasomotor changes is the assumption of an oedema of the labyrinth due to a faulty water metabolism (Mygind and Dederling⁷) or the increased intralabyrinthine sodium ion concentration advanced by Furstenburg⁸ and his associates.

The part played by foci of infection, I believe, has been over-emphasized. However, chronic infection in the gastro-intestinal or respiratory tract, teeth, tonsils, sinuses, gall bladder and colon, may exert a direct toxic effect upon the labyrinth. Any generalized

endogenous infection, as well as exogenous poisons such as alcohol, nicotine or quinine through their vasomotor effects may result in spasm, oedema or even hæmorrhage into the labyrinth. Undoubtedly labyrinthine disturbances may arise on an allergic basis as pointed out by L. W. Dean.⁹ I have seen a patient with him who for twenty years had a known sensitivity to crisco. Immediately upon its ingestion, he developed in addition to his urticaria and angioneurotic oedema, acute Ménière-like attacks—severe vertigo, prostration, impaired hearing. These attacks occasionally resulted in unconsciousness.

AURAL DISEASES

External otitis or foreign bodies in the external canal may cause a rotatory type of vertigo either by slightly irritating the labyrinth by increasing the intralabyrinthine pressure, or by setting up other secondary changes in the inner ear. In middle ear disease of a non-suppurative nature or even Eustachian tube obstruction as pointed out by Brand,¹⁰ vertigo may result.

The mild though progressive vertigo associated with chronic otitis media, indicates a perilabyrinthitis and threatens an actual extension of the suppurative process into the labyrinth. The sudden onset of vertigo, nausea, vomiting, nystagmus and deafness points to an actual break through of the middle ear supuration. The diagnosis is seldom in doubt in the presence of chronic middle ear disease and early surgical intervention is indicated.

DISEASES OF THE CENTRAL NERVOUS SYSTEM

Vertigo in central lesions may be due to actual pressure on the vestibular system or to direct lesions of the vestibular nuclei or their pathways. Any general increase in intracranial pressure may cause compression of the endolymphatic sac which is in turn conveyed to the membranous labyrinth. At first the vestibular system may be stimulated and later paralyzed, the hyperexcitability of the labyrinth giving way to hypoexcitability or complete loss of function. The intensity of the vertigo depends upon the rapidity of the progress of the lesion, being more marked in trauma or acute inflammatory processes.

Cerebellopontine angle tumours, which are most frequently acoustic neurinomas, may produce the symptom by pressure on the trunk of the eighth nerve, or its nuclei. If it interrupts

the continuity of the nerve both cochlear and vestibular degeneration will result. In the early stage, either acoustic or labyrinthine symptoms may be first noted. As the pressure on the nerve increases the auditory symptoms may change; the tinnitus may disappear and the deafness become total. If the vestibular disturbances is severe Ménière-like attacks may occur.

The differential diagnosis between peripheral labyrinthine and central disease is not always easy when vertigo is the first and most prominent symptom. Its association with the other subjective and objective signs and their order of appearance and relationship provides the clue. Peripheral labyrinthine vertigo is always a turning vertigo. Apparent movements of surroundings are usually more common than movements of the body. Brunner¹ points out that the sensation of lateropulsion is a symptom of non-suppurative central disease rather than inner ear disturbance.

In peripheral labyrinthine involvement changes in the position of the head will either precipitate or increase the severity of the symptom. In a central lesion this has no effect on the vertigo. In this peripheral type, an attack usually lasts only a few seconds or minutes. Only when there is a sudden break-through of pus or hæmorrhage into the labyrinth does the attack persist. Central vertigo develops gradually and remains for weeks, months or years. Fischer¹¹ stresses the importance of a disproportion between the vertigo and the nausea and vomiting, as well as localized headache pointing to a central lesion.

Disturbances of consciousness or loss of consciousness do not usually belong to the picture of inner ear disease. The vertigo following severe concussion may be of a true rotatory type, and may persist as the only symptom for years, or may be associated with loss of memory, hearing impairment, or tinnitus or emotional instability. This is important to remember in compensation cases where a neuropsychiatric basis is suspected. Severe concussion may have set up a chronic labyrinthine disturbance. Vestibular tests may give a clue to the validity of the complaint.

DIAGNOSIS

The presence of labyrinthine involvement may be surmised or completely ruled out by an exact history. Any associated subjective

or objective symptoms such as impairment of hearing, tinnitus, or nystagmus, strengthen the presumption that it is labyrinthine. A careful otological examination is necessary to rule out acute or chronic disease. Campbell¹² notes that a cholesteatoma may be present with a dry ear. Any or all of the recognized vestibular tests may be done. They are difficult to do and more difficult to interpret during an attack. The caloric test of Barany or the Kobrak⁴ minimal stimulation method may give helpful information. Since labyrinthine vertigo is so often associated with acoustic symptoms, an audiometric test should be done in every instance. Both air and bone conduction should be investigated.

In all vestibular responses are present, either normal or proportionately exaggerated or diminished, and hearing tests show little change, both labyrinths may be presumed intact, and the vertigo is probably the earliest symptom of labyrinthine irritation. If no aural cause is found a careful neurological and general physical examination is necessary. Stress has been laid, early in this paper, on the important part played by arteriosclerotic changes of the cerebral vessels and of intoxications and allergic disturbances in the etiology of the symptom.

TREATMENT

Since rotatory vertigo may be only a manifestation of extra-labyrinthine disease, the treatment may well rest with the neurosurgeon or the internist. As regards the labyrinthine syndrome known as Ménière's disease, the treatment in the past has been almost entirely empirical. Only within the past few years have various investigators presented more or less logical theories of the underlying pathological process and these have not been confirmed in any instance entirely. However, based upon these theories, more rational methods of attacking the problem have been evolved. It is sufficient here to mention the more popular theories of etiology and the treatment based upon them.

Furstenburg¹ and his associates report for some years excellent results in a large series of cases treated by his salt-free dietary regimen, supplemented by ammonium chloride on the assumption of an increased sodium ion concentration in body tissues. They report as high as 85% complete cures or at least complete

arrest of symptoms in cases so treated when the regimen is rigorously followed. Believing the condition is due to a disturbed water metabolism, Mygind and Dederling¹⁰ advocate restriction of fluid intake to 700 c.c. daily. They report loss of vertigo and nystagmus in 151 of 157 cases.

Sheldon and Horton¹³ use histamine diphosphate parenterally administered. Campbell¹⁵ in 1934 reported very encouraging results. Atkinson greatly elaborates on his method, and dividing all his cases into the vasodilator (allergic) and vasoconstrictor group, administers histamine or nicotinic acid, depending on their reaction to the histamine sensitivity test. In his latest report, of 110 cases of the vasoconstrictor group treated with nicotinic acid and thiamine complete relief from vertigo was obtained in 42 and improvement in 51 instances.

In the small series of cases in which the diagnosis of idiopathic Ménière's disease has been made, I have tried a combination of the above methods. For this reason, no particular method can be credited with specific beneficial effects.

During an acute attack the patient is placed in a recumbent position in bed, in a semi-darkened room and given assurance that the attack is self-limited, since in the more severe paroxysms there may be a great anxiety, even to the feeling of impending death. Some form of sedation is given to reduce central excitability. I have found the combination of scopolamine (gr. 1/600) and hyoscyamine (gr. 1/150) orally, as advocated by Cawthorne¹⁴ to be useful. Since fluid control is an easy measure, the intake is restricted to 750 to 800 c.c. daily.

Following the attack, a histamine skin test is done. I have not regarded too seriously the rigorous interpretation of the test as advocated by Atkinson. If this is positive, histamine desensitization is started, if negative nicotinic acid intramuscularly is given according to Atkinson's regimen. Both these forms of therapy require painstaking care. The optimum dosage, especially with the nicotinic acid group is not easy to determine.

It is often economically not feasible for rural patients to attend for treatment by parenteral methods, three or four times weekly over a period of many weeks or months. In this small group of cases, I have combined the restriction of fluids with the Furstenburg regimen, giving

them the very complete salt-free diet program as laid down by that investigator. In a series of eight cases treated with benzyl cinnamate (Jacobson's solution) in the presumed vasoconstrictor group, five showed a complete recovery, during or immediately following the first course of treatment. The attacks recurred in three of these cases within three weeks to one month.

Undoubtedly there are some cases that cannot be controlled medically. Where the severity, frequency and resultant economic and social distress of the attacks is increasing, recourse must be had to surgery.

Dandy¹⁵ advocates section of the vestibular division of the eighth nerve and in his hands excellent results were attained. Portman¹⁶ drains the endolymphatic sac. Day¹⁷ and Goodyear¹⁸ attempt to destroy the affected labyrinth by coagulation. Campbell¹² reports an excellent result following partial labyrinthectomy, following the Milliken technique. Mollison¹⁹ injects absolute alcohol into the horizontal semicircular canal. Lastly Mogan and Baumgartner⁵ obtained at least a very satisfactory temporary result from cervical ganglionectomy in one case. I have had no experience with the surgical treatment of the condition.

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"Le progrès des sciences rend inutiles les ouvrages qui ont le plus aidé à ce progrès. Comme ces ouvrages ne servent plus, la jeunesse croit de bonne foi qu'ils n'ont jamais servi à rien."—Anatole France.

OCCUPATIONAL THERAPY IN RHEUMATOID ARTHRITIS

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"Employment is nature's best physician and essential to human happiness." (Galen, 172 A.D.)

OCCUPATIONAL therapy aims to restore diseased and handicapped persons to the normal or nearly normal when possible, and when necessary it endeavours to discover for the handicapped suitable scope for productive and useful activities. Finally, if this is not attainable it tries to provide hobbies or diversions to promote in the patient a more objective and philosophic attitude of mind.

The occupational therapist is professionally trained to carry out the physician's or surgeon's prescription through the selection and adaptation of activities which meet the patient's physical and psychological needs. The therapist also provides the physician or surgeon with information regarding the patient's symptoms, reactions and progress while under treatment.

There are broadly speaking three main types of occupational therapy which are applied to the convalescent treatment of disease or injury:

1. *Functional therapy*, which has a definite objective towards the restoration of function in injured or diseased muscles, nerves or joints. This includes carpentry, painting furniture, gardening, weaving, leather work, modelling, pottery, etc. In fact, any productive work which interests the patient and at the same time exercises the desired muscles. The objective being to restore the patient to a suitable earning position.

2. *Diversional therapy*, which includes the simple arts and crafts, hobbies and allied handicraft activities. Success in this subdivision depends on psychological insight, ingenuity and unselfishness on the part of the therapist.

3. *Pre-occupational or pre-vocational therapy*.—This comprises prescribed exploratory procedures in the sheltered workshop which are planned to develop aptitudes and interests in a specific occupation to be used as a guide to vocational training in the new trade or profession. When a patient is unable to return to his previous occupation, productive suitable work may be made available after studying motivation of the patient in conjunction with investigation through the doctor, supplemented

by the social service worker and psychological aptitude tests. An arrested uneducated arthritic's activities might vary anywhere from weaver to gardener, or in the professional field from broadcasting to librarian.

Occupational therapy should be prescribed as carefully as physiotherapy in order to obtain the desired result, and careful supervision is often necessary. It is important to prevent overwork on the part of the patient. Some form of occupational therapy is, therefore, a well recognized form of treatment for the arthritic patient and should always be included as a definite part of the hospital routine because even before active exercise is indicated the psychology of suitable mental activity contributes greatly to maintaining or restoring morale. The type of occupational therapy employed covers a wide range of activities which includes the playing of various games, weaving with small bed loom, knitting, sketching, inlaid linoleum block work, typewriting, etc.

It should be clearly understood that the work must be supervised to insure correct posture and avoidance of fatigue. As the condition improves in due course the patient should be referred to the sheltered workshop of which again there should always be one in every hospital which treats chronic conditions, as obviously occupational therapy is a form of Physical Medicine and should be closely associated with the department of physiotherapy. In hospital the ideal set-up should be under the direction of a physician who should be a specialist in physical medicine. Often in practice occupational therapy immediately follows appropriate physiotherapy, (heat, massage) which stimulates exercise at a time that is often free of pain and thus carefully selected activities provide the necessary stimulus and incentive for such movements. Conditioning with music or gramophone record often is advantageous in the early stages and in this way occupational therapy aids in muscular and joint co-ordination and hastens the return of function in injured tissues.

Finally contact with other patients at various stages of the disease has a profound psychological effect in encouraging the arthritic.



CASE REPORTS

BONE PLATING FOR FRACTURES OF THE MANDIBLE

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For some time I have been concerned over the present status of treatment of fractures of the mandible in general surgical practice. The common method in use today, that of wiring the jaws together, is by no means satisfactory and is the cause of a great deal of morbidity and danger to the patient. It is a tedious and time-consuming job, very often marred by poor fixation and occlusion. Many will remember having spent two hours on a difficult repair only to have the wires break on the last twist or to have the patient cough or vomit and ruin the job. I believe that one must agree that general anaesthesia for wiring of teeth is dangerous and that on the whole, patients are not happy under local anaesthesia.

These facts and many others have caused a few on our surgical staff to keep an open mind on the treatment of this morbid disability. It is true that recently Stader splints in the hands of experts have proved reasonably satisfactory, but if four good-sized pins can be placed in the mandible without injury to the inferior alveolar nerve and without undue risk of infection, it appeared to me that at least under certain circumstances, bone plating would be more desirable. The texts on surgery but rarely mention bone plating as a method of fixation. Neither do they condemn it. Any method which could be rapidly accomplished without undue risk, that would give complete and accurate fixation and allow the patient to have an open clean mouth capable of ingesting a soft diet immediately, seemed to me to have much in its favour. With these ideas in mind a suitable case is presented.

Mr. G.A., a white male, aged 45, was playing with a large collie dog on August 1, 1946, when the dog jumped up suddenly, striking the left ramus of his mandible with its head. The patient was momentarily stunned and felt pain on the left side of his jaw. The jaw became swollen and tender and then subsided within a few days.

On August 4, he developed pain and swelling in the middle of his right ramus and decided that he should have the one remaining molar tooth pulled. This tooth was pulled with difficulty without anaesthesia and one loose root was left *in situ*. Following this the right side of his jaw became swollen and painful and it was impossible for him to close his mouth. There was a block back near the angle of the jaw with overriding and right lateral deviation of the jaw in front, making him very uncomfortable and rendering mastication impossible.

He presented himself to me on August 16 with a hard tender swelling over the mid-right ramus, with protrusion overriding and mal-occlusion. He had lost some 20 lb. in weight and was most uncomfortable. The left ramus of the mandible did not reveal any swelling or tenderness. Intra-oral examination revealed a loose root in the area corresponding to the right ramus swelling but no other teeth present in this area. The only teeth present in the mouth were the third left molar, the central and lateral incisors, and the two canine teeth in the mandible, and one central incisor and one canine tooth in the maxilla. These remaining teeth were set in unhealthy gums revealing pyorrhoea alveolaris.

The loose remaining root in the right ramus of the mandible was extracted and the patient sent to hospital for x-ray examination and chemotherapy. Radiographs revealed vertical fractures in both rami of the mandible just posterior to the mid-portion with considerable luxation (Fig. 1). He was placed on penicillin and sulfa therapy for 4 days and on August 20 he was operated upon and fixation accomplished on both sides with vitallium bone plates (Fig. 2). Penicillin

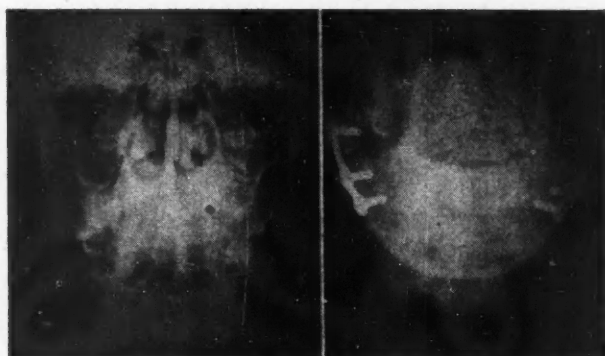


Fig. 1

Fig. 2

Fig. 1.—Before immobilization: Fractures are seen through both rami; rarefaction from root abscess is seen in the right ramus above the fracture.

Fig. 2.—After immobilization: Vitallium plates held by screws are seen *in situ* embracing and securing the fracture lines.

was injected locally into the operative sites and was continued parenterally postoperative. Solid fixation with good alignment was obtained readily and the patient was returned to bed in good condition with a solid mobile jaw. He was able to take fluids from the start and was taking a soft diet by the third postoperative day. Mouth hygiene was no problem as the patient was able to clean and rinse his mouth several times daily from the start. Calcium fluoride tablets were dissolved slowly in the mouth daily in order to sweeten the breath and to reduce the oral bacterial flora.

The fine plastic sutures were removed from both wounds on the sixth postoperative day, the wounds having healed by primary intention leaving a fine linear scar $1\frac{1}{2}$ " long along the inferior border of each ramus of the mandible. Radiographs taken on the eighth postoperative day revealed the fractures in good apposition with no evidence of osteolytic change. He was discharged on the 14th postoperative day in excellent condition, being able to move his jaw freely, eat a semi-solid diet, and to chew gum for exercise. Radiographs taken 28 days postoperative revealed both fractures in good alignment with evidence of callus formation and no signs of infection.

I believe the advantages of this method of fixation far outweigh any risk of infection under present day methods and the contrast in morale of this patient as compared with one having been immobilized by wiring is remarkable.

PREGNANCY ASSOCIATED WITH ADENOMYOMA OF THE UTERUS

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In 1860 Rokitansky¹ described a condition characterized by the heterotopic occurrence of islands of endometrium scattered throughout the myometrium. Many names have been given to this condition, but it is usually known as adenomyosis, adenomyoma, or internal endometriosis. In 1932 Frankl² pointed out that 20 years before he had been the first to describe the macroscopic and microscopic characteristics of "Adenomyosis Interna", and to show that it was a separate clinical entity. Since the early days of this century much has been written on the subject of adenomyosis and endometriosis. The classical contributions of Sampson have done much to establish the true nature of this condition.

A careful, but by no means exhaustive, review of the literature reveals but few reported cases of adenomyoma of the uterus associated with pregnancy. This is possibly due to the fact that pelvic endometriosis is a frequent cause of female infertility.

It is not surprising that such tumours should show a decidual reaction in their stroma. Ectopic endometrium reacts to hormonal stimuli in the same manner as does the endometrium of the uterus. Decidual change occurs in the uterine endometrium as a result of stimulation by the hormones elaborated by the corpus luteum of pregnancy and therefore these same hormones stimulate the formation of decidua in islands of aberrant endometrium.

The reported sites of ectopic decidua formation correspond with the distribution of areas of endometriosis. Decidual cells in areas of endometriosis have been reported in the recto-vaginal septum,^{3, 4, 5, 6} peritoneum of the vesico-uterine space,⁷ cervix,^{8, 9} ovary,^{10, 11, 12} pelvic peritoneum,^{13, 14} pelvic lymph nodes, diaphragm, and splenic capsule,^{15 to 18} vagina,¹⁹ Fallopian tube²⁰ and appendix.²¹

Cases of adenomyoma of the uterus in association with pregnancy and showing a decidual reaction have been reported by Lochrane,²² Sackett,²³ Cullen,²⁴ Ascheim,^{25 to 27} Amos,²⁸ Schweitzer,²⁹ Meyer,³⁰ Sampson,^{10, 31} Szenes³² and Williams.³³

Generally speaking the diffuse type of adenomyosis of the uterus is more common than the circumscribed type. The case here reported is of the latter variety. These growths are typically localized and may occur in any portion of the uterus, but the majority are seen at one or other cornual area. Most of them are at first diagnosed as fibromyomata and the true nature of the lesion is not determined until an operation is performed.

In cases of adenomyosis of the uterus and pregnancy two serious complications have been reported. Firstly, in the cases reported by Sackett,²³ Schweitzer²⁹ and Szenes³² severe atonic post-partum hæmorrhage occurred which necessitated hysterectomy. In each case adenomyosis was present. Secondly, uterine rupture has been explained on the basis of the presence of adenomyosis as reported by Schafer,³⁴ Richardson,³⁵ Schugt³⁶ and Stone.³⁷

M.E., a primipara, aged 35, whose expected date of confinement was December 10, 1945. She was first seen on November 22, when she was about 8½ months' pregnant. Since the age of 19 years she had suffered from multiple sclerosis. So far as could be determined her pregnancy had caused no change in this condition.

Her menstrual history was normal, her periods beginning at age 14, coming at 28 day intervals and lasting 3 days. She had never had any dysmenorrhœa or menorrhagia. The pregnancy had been normal to date.

Examination, which will be concerned only with her pregnancy showed: blood pressure 116/70; weight 105½ lb.; hæmoglobin 96%. Blood Wassermann negative. Blood group O, Rh positive.

The uterus was enlarged to the size of a full-term pregnancy. A nodule was felt on the anterior uterine wall near the left cornu which was thought to be a fibroid. The fetus was estimated to be small in size and was presenting by the vertex in the R.O.A. position.

Pelvic mensuration revealed that the patient had a very small gynæcoid type of pelvis. Estimation of the cephalo-pelvic relationship showed that the fetal head was completely over-riding the full width of the symphysis pubis and it was impossible to push the head into the pelvis. It was obvious that this patient could not deliver herself naturally and, in addition, there was her neurological condition. With these considerations in mind it was felt that elective Cæsarean section was the treatment of choice.

Accordingly, on November 26, a lower segment Cæsarean section was performed under cyclopropane-oxygen anaesthesia. The baby, a female weighing 5 lb. 7¾ oz., was delivered with ease and was in good condition.

When the uterine incision had been closed the tumour in the region of the left uterine cornu stood out quite markedly. Its exact site was just medial to the insertion of the left round ligament. Since it was felt that this was a fibroid a myomectomy was attempted, but it did not enucleate easily. No line of cleavage could be found and sharp dissection was required to remove the tumour. The tumour mass was completely surrounded by myometrium and no connection with the uterine cavity was determined. Further examination of the uterus failed to reveal any other tumours.

The patient made an uneventful recovery and was discharged on the 14th postoperative day.

Pathological report.—The specimen consists of a firm, pinkish, cystic mass measuring 3.5 x 2.5 x 0.5 cm. The

surface is composed of pink muscular tissue. On section the mass is seen to contain chocolate-coloured, viscous fluid. The wall measures up to 0.7 cm. in thickness.

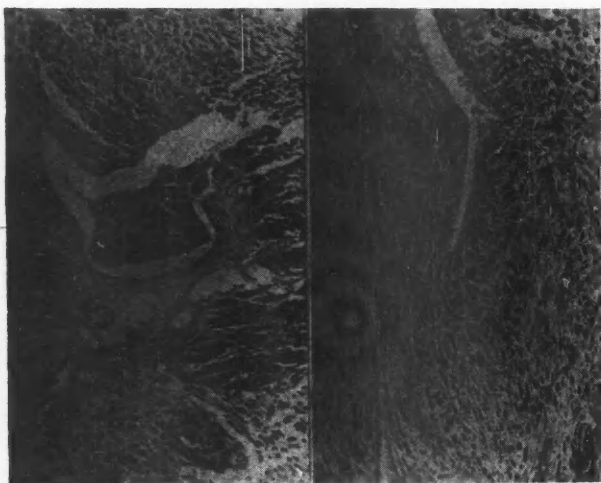


Fig. 1

Fig. 2

Microscopic.—The wall of the mass removed is composed of muscle fibres. The central cystic portion is lined by large decidual cells showing phagocytosis of blood pigment. Endometrial glands surrounded by decidual cells are present (Figs. 1 and 2).

CONCLUSIONS

A case of adenomyosis of the uterus associated with pregnancy and showing a decidual reaction in its stroma is reported. This pregnancy was present in a patient with multiple sclerosis.

A review of reported cases of decidual reaction in areas of adenomyosis is presented.

I wish to acknowledge with thanks the help rendered by Dr. D. W. Penner, Assistant Pathologist, Winnipeg General Hospital, in the preparation of the photomicrographs.

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STAPHYLOCOCCIC PYÆMIA DUE TO BREAST ABSCESS IN AN INFANT*

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London, Ont.

A review of the standard English and German textbooks of pædiatrics and the publications of the last twenty-five years on breast abscess in infancy, has failed to reveal one recorded case resulting in fatal pyæmia. It was, therefore, considered worth while to report this case, which presented a problem in clinical diagnosis.

R.H., a white, breast-fed, male infant, one month old, normal delivery, was admitted to the Children's Hospital on October 11, 1944, at 8.00 a.m. He had been well until four days prior to admission, at which time he was weaned owing to an illness of his mother. On artificial feeding he had not been well during the four days previous to admission, showing indefinite symptoms including some vomiting, refusal to take feedings and marked irritability.

On admission, the infant looked very ill, as if profoundly shocked. The temperature was 101°. On physical examination nothing abnormal was noted except some swelling and induration of the left breast. This was interpreted as a physiological congestion and swelling due to maternal hormones (so-called "physiological mastitis" of the new-born infant). The right breast was normal. A white blood count showed 4,000 leucocytes, 65% of which were neutrophils.

The infant took little of his feedings. He was given interstitial fluids. In the evening a fine maculopapular rash developed on the trunk. Later he became very listless and looked very toxic; twitching of his eyes developed. He died approximately 21 hours after admission.

Autopsy findings.—An autopsy was performed 4 hours after death. The body weighed 4,130 grams (9.1 lb.) and the crown-rump length was 37 cm. The trunk and proximal parts of the arms and legs showed a patchy, reddish, maculo-papular eruption associated with which were a few scattered pustules containing minute drops of pus. The umbilical stump was normal. The left breast showed an elevated indurated swelling about 2 cm. in diameter immediately deep to the nipple and areola. Upon incising the breast tissue about 3 c.c. of thick, creamy, odourless pus under tension escaped from an abscess cavity. The left axillary lymph nodes were not enlarged. The right breast was normal.

The peritoneal cavity contained 50 c.c. of clear pale yellow fluid. The right pleural cavity contained 60 c.c. of faintly turbid, yellowish fluid. The left pleural cavity was normal. The pericardial cavity contained 30 c.c. of normal fluid.

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The heart showed toxic myocardial degeneration but no gross abscesses. Small pyæmic abscesses were present in both lungs. Some of these lay just under the pleura and a localized pleuritis had developed over them. The liver and kidneys showed cloudy swelling but no abscesses were detected in them. The spleen was not enlarged and the lymphoid follicles were not discernible. Hæmorrhages were present in the medulla of both adrenals.

Microscopical sections taken through the left breast showed abscesses in the fat surrounding the breast tissue and extending into the underlying pectoral muscle (Fig. 1). The myocardium showed several early pyæmic abscesses (Fig. 2). Sections of both lungs showed multiple small pyæmic abscesses (Fig. 3). The myocardium, liver and kidneys showed albuminous degeneration and the liver sinusoids were intensely congested. Fairly diffuse hæmorrhage was present in the medulla of both adrenal glands.

Cultures taken at autopsy from the breast abscess, the pleural and peritoneal fluids, the urine and blood, were all positive for *Staph. aureus*.

it may develop into an abscess which should be dealt with by surgical measures as in the adult.

It seems worth while emphasizing that a unilateral swelling of the breast in an infant should not be looked upon too lightly and the possibility of its being due to infection should be kept in mind. The pathogenesis of the breast abscess in this case is in doubt. The mother denied squeezing or traumatizing the breast in any way. No obvious focus of infection was discovered. The infection of the skin developed subsequently to the disease of the breast. So far as is known infection of the

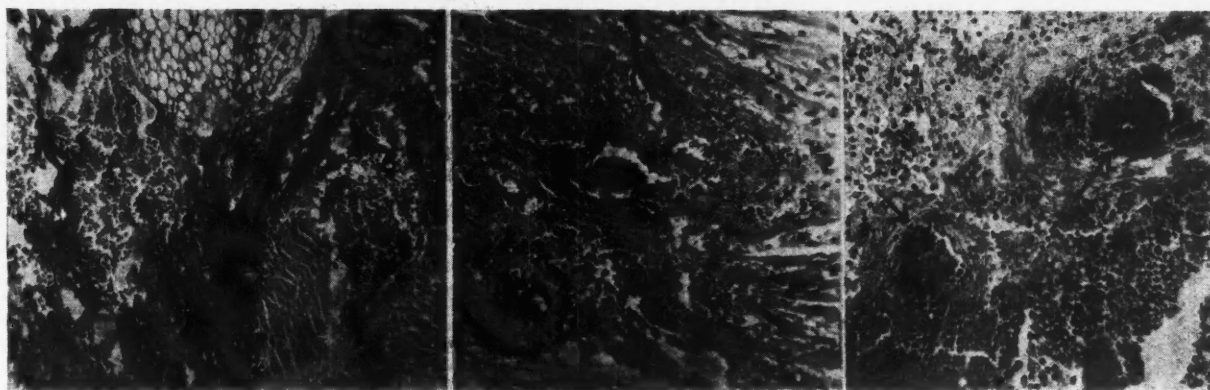


Fig. 1

Fig. 2

Fig. 3

Fig. 1.—A indicates an abscess in the fat at the periphery of the breast tissue. B is an abscess in pectoral muscle (X 120). Fig. 2.—Pyæmic abscess in myocardium. Note bacterial embolus in venule with abscess in surrounding myocardium (X 230). Fig. 3.—Pyæmic abscess in lung. Arrows indicate bacterial emboli in small pulmonary arteries with abscess formation in surrounding lung tissue (X 230).

DISCUSSION

This is a case of staphylococcic pyæmia originating in an abscess of the left breast and metastasizing to the skin, lungs and myocardium. The infection of the breast was probably superimposed upon a "physiological mastitis". The profound shock and circulatory collapse of the infant may be explained by the myocardial damage and hæmorrhage into the medulla of the adrenal glands but the clinical picture was not interpreted as a Waterhouse-Friederichsen syndrome.

"Physiological mastitis" is very common during the first month of infancy. It usually gives rise to a swelling of both breasts and affects both sexes equally. In the majority of cases the swelling subsides spontaneously. Lack of cleanliness and manipulation of the breasts favour retrograde infection, which is almost always unilateral. The infection may subside, resulting in distortion of the nipple and atrophy of the breast in later life, or rarely,

nose and throat did not exist prior to or during the illness of the infant.

Pyæmia in infancy is rather rarely encountered in present day practice. Young infants are unusually susceptible to infections with pyogenic bacteria, and *Staph. aureus* is the commonest cause of infection in the neonatal period. Lymph node activity and the phagocytic powers of leucocytes are depressed at this age. Premature and artificially-fed infants are less resistant to infection than mature and breast-fed ones. The umbilicus is a common portal of entry for infections in the newborn infant. Infections may also enter through the respiratory and digestive tracts. The primary site of the infection may not be clinically obvious (cryptogenic sepsis).

The breast is hardly mentioned as a possible source of infection in pyæmia, although the hyperæmia commonly present in the breast during the neonatal period should create a

favourable environment for bacterial growth and favour its dissemination.

SUMMARY

A fatal case of staphylococcal pyæmia originating in a breast abscess in a male infant one month old is reported.

The disease ran a severe short course of about five days. This fulminating course may be explained by the known virulence of *Staph. aureus* for young infants in whom cellular resistance is low.

The breast abscess was apparently superimposed upon a "physiological mastitis". This is a rare complication.

POLYOSTOTIC FIBROUS DYSPLASIA*

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The case herein reported conforms to the description by Louis Lichtenstein¹ of a skeletal developmental anomaly affecting several bones with a predominantly unilateral involvement. The cause is unknown, but the characteristic pathological picture is a disturbed function or development of the bone-forming mesenchyme resulting in the medullary cavity filling with fibrous tissue containing bone spicules (Fig. 1). The cortex is thin and the bone broadened (Fig. 2). A pathological fracture as in this case is usually the first indication of the disease. There is an increase in the serum alkaline phosphatase. The serum calcium is at the higher limit of normal, while the serum phosphorus is within normal limits. Albright has described a syndrome of fibrous replacement of bone associated with pigmented skin areas, endocrine dysfunction, and precocious puberty in females. This patient had a small pigmented area on his back, but no endocrine disturbance.

The patient, T.A.J., aged twenty-one, was a healthy, well-developed male. Two months before admission while playing soccer he was kicked on the shin and was kept in bed for several days. A month later he was again kicked in the same place, and a roentgenogram revealed a cyst of the tibia with a crack through the cortex, and some callus formation. On admission to this hospital on August 14, 1944, he was still complaining of pain in the leg. There was nothing significant in his history and no familial bone disease was reported. On examination there was a fusiform swelling

about 4" long over the right tibia. It was firm but not tender, and there was no increase in the skin temperature. He could bear weight on the limb and had a full range of movement in the adjoining joints.

Laboratory findings.—Urine including Bence-Jones test negative; sedimentation rate 5 mm. per hour; white blood cells 5,400; serum alkaline phosphatase 9 units (Bodansky); serum phosphorus 2.7 mgm. per 10 c.c.; Wassermann negative.



Fig. 1.—Micro-photograph (X160) of tissue taken at biopsy showing fibrous tissue with bone spicules scattered throughout.

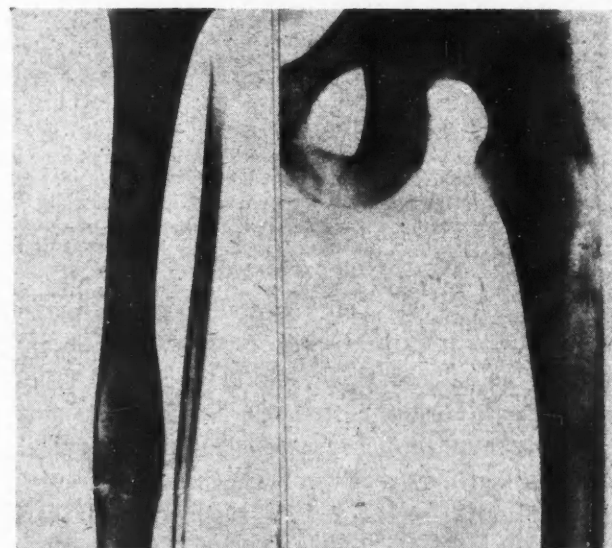


Fig. 2

Fig. 3

Fig. 2.—X-ray of the right tibia showing the expanded shaft with thinning of the cortex and a crack through the bone. Fig. 3.—X-ray of the right femur showing a large cyst with thinning of the cortex, but no expansion of the shaft.

Roentgenograms (Fig. 2) disclosed an expansile swelling of the lower shaft of the right tibia with thinning of the cortex. A crack was present through this with callus formation. In the upper shaft of the right femur (Fig. 3) there was another cystic area with thinning of the cortex but no expansion of the shaft. No other bony abnormality was discovered in the skull, ribs, humeri, forearm bones, or the opposite femur and tibia.

A biopsy was done. The cortex was thin, but of normal texture. A small section was removed and the

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medullary cavity found to be packed with dense whitish fibrous tissue, rubbery in consistency and not very vascular. Some of this was taken for section.

Pathological examination (by Dr. W. Donahue).—The tissue is composed of a myxomatous type of fibrous tissue which is rather loose and oedematous. Scattered throughout this area are a few areas of bone formation with some calcification. The cells are quite regular, and there is no evidence of malignancy or inflammation, (Fig. 1).

Curretting and bone grafting of the affected bones was considered, but in view of the reported replacement of such grafts with fibrous tissue, this was not carried out. At the time of discharge from hospital, October 6, 1944, for repatriation to England, the patient was having no symptoms and walked without a limp.

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CUTANEOUS MYIASIS OCCURRING IN WESTERN CANADA

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Cutaneous myiasis is an infestation of the skin and subcutaneous tissues by larvæ of *Wohlfahrtia vigil*, commonly known as the flesh fly. The disease is relatively rare. This fly is a human and animal parasite and is found only in Canada and northern U.S.A.

Considerable work on the subject has been presented by Walker¹ of the University of Toronto who reported in 1931 a total of 6 cases since 1919. A further four cases were reported in the Toronto area in 1934. Other cases have been presented by Gertson,² Sanders,³ Vanderluis, Charles and Whitmore⁴ in the United States. In a personal communication Dr. E. H. Strickland, Professor of Entomology, University of Alberta advises that cases have occurred in Alberta all the way from Athabasca Landing to the International Boundary but these have not been noted in the literature to date.

All cases but one have been reported in infants under one year of age. The small abscess-like lesions appear on the chin, neck, shoulders and arms. The fly is said to usually lay its larvæ on the skin of the child while it is lying out of doors, or in a non-fly-proof room, and initially near the eyes, where it is attracted by tears. The larvæ seek cover and move to the skin folds of the neck beneath the upper clothing. Their saliva is said to digest the skin and they enter

and feed, and a lesion results. A small opening at the apex of the lesion frequently suggests pus and has occasionally led to a mistaken diagnosis of impetigo or furunculosis. On close examination the small white apex is seen to be a maggot and on pressure, it can be forced out of the lesion.

As described by Norma Ford,² the insect *Wohlfahrtia vigil*, is closely related to the house fly and blow fly, or blue bottle. On the other hand it is parasitic on living tissues. All infested infants have been noted as sleeping unprotected out of doors. In the case presented, the infant was said to have been inside. However, there were many flies inside this house and because of poor sanitation, no protection from flies was present.

The patient, a two weeks' old female child, previously normal and in good health, was brought in from a farming community in south western Saskatchewan. Approximately 24 hours before admission, the mother noticed some "red pimples" on the shoulders, back of neck, chest and left forearm. She stated that they gradually became larger and the baby was very cranky and would not take its feedings, and as the rash grew worse, the mother sought medical attention. She said that she had the impression that in one of the lesions she could see worms.

On examination the baby was found to be a normal two weeks' old child, the skin was generally flushed and she cried continually. Temperature 101°, pulse 140, respiration 24. Distributed on the chin, back of neck, left chest and forearm were 10 discrete red lumps, resembling small boils. The lesions were peculiar in that they presented momentarily the appearance of having white apices, alternately followed with what appeared to be small orifices of 2 mm. in diameter. The skin was generally covered by a fine diffuse erythema. With a slight pressure to each lump, a section of what appeared to be a maggot could be expressed, and with a little added pressure, it was possible to express a maggot from each lesion. Only one larva was expressed from each lesion, although it has been reported in other cases that more than one are occasionally present. On expression of the maggot a small gob of purulent material followed. It was not necessary to incise the lesions to remove the offending organism. The maggots were white, round and segmented, and measured approximately 4 to 8 mm. in length. Several of the maggots were placed in an alcoholic solution for pathological examination. It was noted that they lived for a short time in this solution.

The baby was placed on 5,000 units of penicillin every three hours, and local boric acid soaks were applied. The temperature fell to normal in 9 hours and in 48 hours all the lesions had disappeared. The baby resumed normal feedings and was able to return home as cured.

The blood count on admission showed, white blood count 23,650, Hb. 100%, polymorphonuclears 38%, lymphocytes 57%, eosinophils 2%, monocytes 3%, urine negative.

The maggots were forwarded to the University of Alberta, Pathology Department and identification was made there with the kind assistance of Dr. Strickland as those of the flesh fly, *Wohlfahrtia vigil*.

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CLINICAL and LABORATORY NOTES

THE USE OF A METALLIC GLENOID RIM IN RECURRENT DISLOCATION OF THE SHOULDER*

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The last few years have seen the gradual acceptance of Mr. Bankart's concept of the pathological lesion in recurrent dislocation of the shoulder, *i.e.*, the torn glenoid labrum with the detachment of the capsule from the antero-inferior aspect of the rim, permitting the displacement of the humeral head directly forward, deep to the subscapularis tendon and muscle.^{1, 2, 3, 6, 7}

Many have found the operative repair of this defect most difficult and some able surgeons have expressed the opinion that satisfactory repair is impossible.

Suture of the capsule to the freshened bone of the glenoid is difficult because of the necessity to place 3 or 4 drill holes in this bony rim. The volsellum forceps and cobbler's awl suffice in some cases but are unsatisfactory and are best replaced by the right-angled dental end-piece attached to a motor or hand drill.⁴ This together with the use of a crochet hook as suture carrier and special retractor make the operative repair technically much easier. The exposure is especially arduous in the well-developed male of sthenic habitus.

Sooner or later, however, all surgeons operating upon these cases will discover some in which the bony rim is fragmented or brittle, and a satisfactory fixation of the capsule to bone cannot be accomplished. These are usually cases which have had frequent forcible dislocations such as occur in inadequately controlled epileptics.

Some workers have been content to suture the capsule to adjacent periosteum or soft tissues while others have employed staples for the fixation.

It was for such cases that I devised a metallic rim (Fig. 1) which could be fixed to the neck of the scapula and which contained the holes for the suture of the capsule to the bone on the joint side of the prosthesis, which is thus placed in an extra-capsular position. In view of experience with the stainless steel plates and screws in fracture work it was felt that the rim would become firmly fixed to the scapula and would offer a much more stable and permanent barrier to the forward displacement of the head than could be obtained by the use of bone grafts.⁵

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The following is a description of the case on which this preliminary report is based.

CASE REPORT

The patient was a female aged 26, a poorly controlled epileptic.

Initial dislocation in April, 1945, during a seizure. Innumerable dislocations since, occurring practically every day. Dislocation occurs straight forward and can be reduced by direct pressure backwards on the head. Marked crepitus present over the front of the joint when this occurs.

Operation, December, 1945.—Anterior approach, with the tip of the coracoid and attached muscles turned

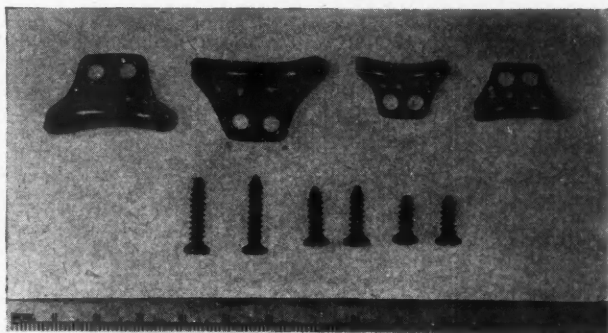


Fig. 1.—The glenoid rim of stainless steel. Two sizes. The holes for screws and sutures can be readily seen.

downwards. Joint opened by section of subscapularis tendon and capsule near the glenoid edge. The labrum was detached for approximately 1¼" from the antero-inferior area. A pouch existed deep to the subscapularis tendon and muscle and anterior to the neck of the scapula into which the head dislocated.

The bony rim of the glenoid was fragmented and only one drill hole in the upper part could be made. The neck of the scapula and deep surface of the subscapularis were therefore scarified and the capsule sutured to the periosteum and adjacent soft tissues. The subscapularis was plicated in its resuture and the tip of the coracoid was stitched to the lower part of the repaired subscapularis to increase scarring.

Postoperative course.—The patient had a seizure on coming out of the anaesthetic which may have damaged

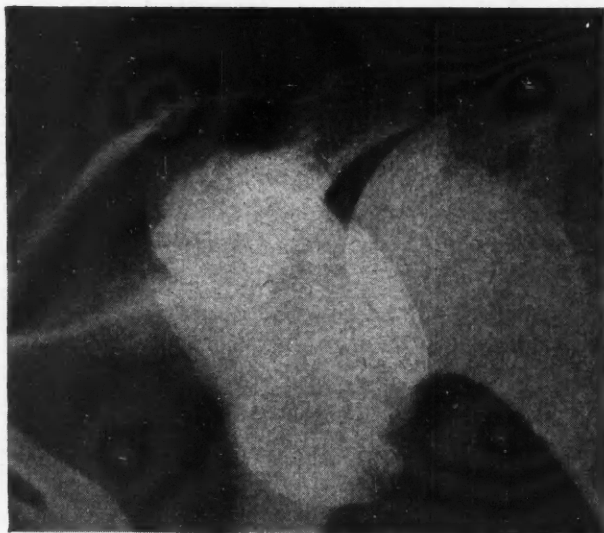


Fig. 2.—X-ray showing the false joint in the subluxated position. Also the posterior notch from recurrent dislocations.

the repair but at the time the arm was firmly bandaged to the side. On October 28, the patient was re-examined. It was easily possible to push the head into a subluxated position with much crepitus over the front of the joint. X-rays (Fig. 2) show that there is the beginning of a false joint cavity in the subluxated position.

In view of this and the marked traumatic arthritis associated with pain it was decided to reoperate and apply a metallic glenoid rim.

Operation, November 25.—The anterior approach was used. On section of the subscapularis near the glenoid rim, the failure of the original repair was seen, with the formation of the false joint just anteriorly on the neck of the scapula. The glenoid bony rim was more fragmented and the head of the humerus showed marked degenerative changes.

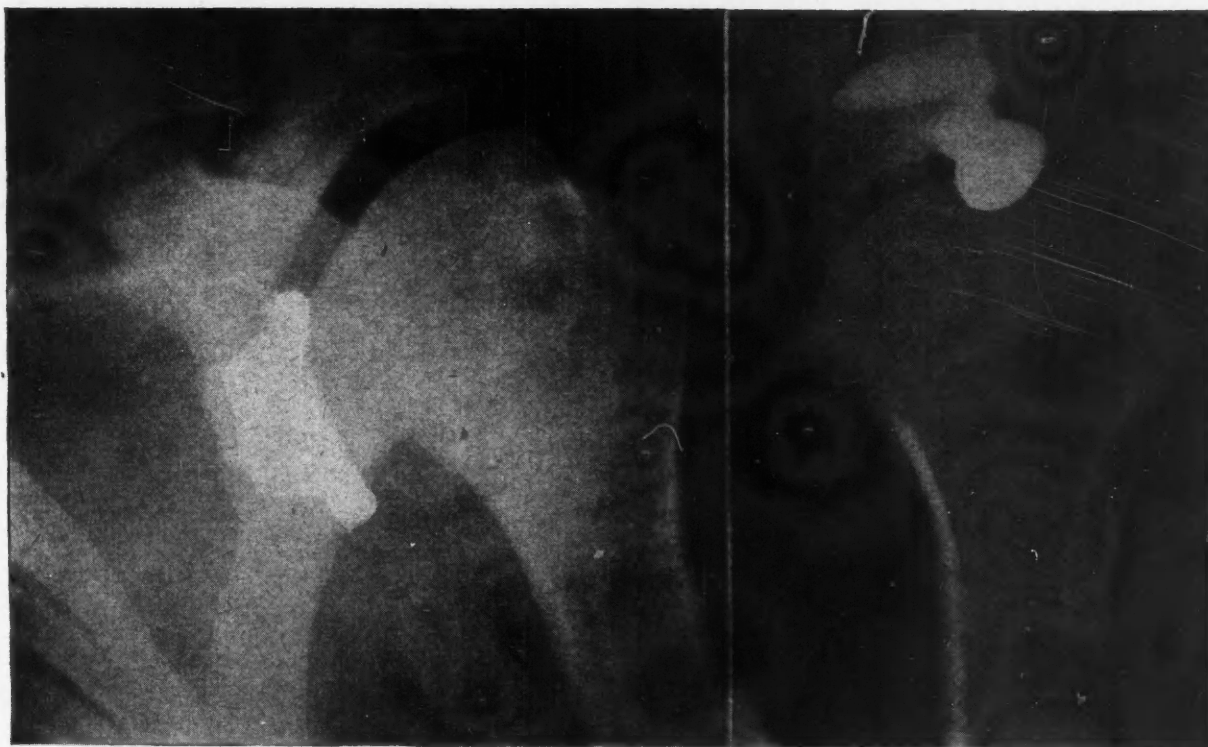


Fig. 3

Fig. 4

Fig. 3.—Antero-posterior view showing prosthesis in position. The rim was placed at operation $\frac{1}{4}$ " antero-medial to the normal position of the glenoid rim, allowing room for the suture of the capsule in the anatomical site. **Fig. 4.**—Supero-inferior view with prosthesis in position. The marked traumatic arthritis can be seen.

The glenoid rim was freshened to expose raw bone and the metallic prosthesis applied, using two $\frac{3}{4}$ " screws. The capsule was sutured to the bony surface on the joint side of the metallic plate. An excellent closure of the joint cavity was thus obtained and the head appeared to be stabilized by this repair. The subscapularis muscle and tendon were repaired over this vitallium rim. The wound was then closed.

Postoperative course.—The patient was kept under heavy sedation for ten days with the arm bandaged to her side. After this period she was allowed to move the elbow and hand. The arm was maintained for four weeks in the adducted position. X-rays show the position of the rim (Figs. 3 and 4).

COMMENT

This is the first case treated with the metallic glenoid rim. The writer feels that there is a limited field for such a prosthesis which experience in its use may enlarge.

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SPECIAL ARTICLE

"NO DISEASE"*

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[After some remarks of a general nature, proper to a commencement address, Dr. MacLean continued:]

The psychiatric problem which this war has brought to a focal point soon will be demonstrated to the public in a manner which cannot be dismissed or denied. The people of the United States and, in all likelihood, of Canada

* Commencement address, University of Manitoba School of Medicine, Winnipeg, July 18, 1946.

will be faced with a situation for which they have been poorly prepared as a result of popular misconception of psychiatric principles, distorted sentimental concepts of functional disability and exaggerated statements as to the efficacy of psychotherapy. Psychiatry must explain, candidly and in simple language, the underlying reasons for its failures in the prevention and treatment of the psychoneuroses and related disabilities of war; it must explain before the ruthlessness of statistical analysis discloses not only inadequacies, but the concealment of facts which are essential for the future, healthy development of our civilization. It must place blame where blame is due and must not shrink from self-criticism.

Customarily, in war, two words have been used to describe the intangible realities which win or lose battles: "courage" and "cowardice". Courage I take to be not absence of fear because few are free of that. Courage, as it usually is encountered, is that moral quality, in the face of fear, difficulty and danger, from which springs unselfish conduct. Cowardice, on the other hand, is the quality which, when fear is a motive, results in selfish behaviour that is contrary to the mores of the group. In the late war the word "cowardice" seldom, if ever, was heard because of the recognized difficulty in distinguishing it from a type of psychoneurosis which is the expression of an illness of the personality rather than of moral guilt.

Prior to the evolution of psychiatry, a man was judged by his acts in battle, which were either courageous, neutral or cowardly. He was expected to be a responsible, moral individual, with the ability to distinguish right from wrong; an individual who had a will, capable of directing his actions according to the dictates of his intellect and appetite. There was little recognition of the effect of environment, in terms of conditioning in childhood and of formation of habit patterns. The realm of the subconscious mind remained relatively unexplored. The act of an adult was judged by its apparent motivation and consequences. In fact, there were simply courageous men and cowards in peace and war.

In the last quarter century, however, the causes of behaviour of adults have been traced to behaviour of the same individuals as far back as intra-uterine life. The normal, integrated psyche has been dissected in its varied evolutions through the realm of the subconscious mind. The abnormalities of personality have been grouped in broad classifications of psychosis, psychopathy and psychoneurosis and their origins have been found in an irresponsible psychogenesis. The result is that a large number of those who profess knowledge of the mind are convinced that man is a relatively irresponsible organism, the product of instinct and environment; that he is an animal whose behaviour is determined by psychologic and

biological laws acting within an ever-diminishing framework of choice in decision.

With this increasing popular recognition of the impact of an individual's past on his present and future behaviour, the ethics of our civilization have correspondingly been interpreted in freudian and behaviouristic terms. Morality is defined in words of instinct and the conditioned reflex, and this scientific language, although it does not change the essence of the thing described, serves to remove the stigma of amoral action. And yet if we are to admit that there are such qualities as courage and fortitude, we must equally insist that there are cowardliness and weakness of character. For if we turn our faces away from the possibility of unethical behaviour, the decorations of our men for valour in battle, and our verbally expressed appreciation of the sacrifices that men have made of their limbs and lives in the defence of their country, become worthless, hypocritical rewards given by a cynical people.

During the past four years, my work was with men who failed the test of war. With other psychiatrists, I met them in the induction line, outside the continental limits, and in the hospitals of the mainland. These thousands who failed were weighed by competent observers, who delved into their past environment, into their childhood reactions and into their family lives. With rare exceptions, the minor disorders of personality which prevented these individuals from performing their military duty to their country, could, with varying degrees of effort, be traced to broken homes, unhappy family lives and unstable fathers and mothers. Nevertheless, war has not created new mental diseases. In time of peace, individuals who suffered from functional disorders were driven by necessity to work and adjust to some level of scholastic, occupational, social and marital adaptation. At no time were they released by society from the responsibility and discipline of meeting the demands of life. They accepted their relative disabilities as personal problems, which they themselves had to solve. They were forced to face the situation, with psychiatric help or without it, and to assume obligations of social and economic import. In military existence, however, tens of thousands of these individuals discovered that their symptoms were sufficient to excuse them from the labours, uncertainties and dangers of war. They found that now there was nothing to be expected from enduring their symptoms except hardship and perhaps death. There was no penalty for failure; weakness was rewarded, and uncounted numbers took conscious or subconscious advantage of this attitude and rendered their disabilities absolute instead of relative. Whereas in civilian life they had been anxious for all the aid that medical science had to offer, and had attempted to make a readjustment in living, when they were in uniform untold numbers resisted therapy and searched for new nervous symptoms to thwart return to duty.

Further, possessed of honourable discharges, they returned to their families with documentary proof that they were victims of disease and war and were not responsible for helping themselves. Yet they were intrinsically no different than when they enlisted. As their lives had demonstrated to their acquaintances and families that they had been capable citizens prior to their enlistment, their discharge from service so involved their pride that many protracted their symptoms for extended periods of time after their release.

I hope not to be misunderstood and yet I recognize that what I have to say can easily be misinterpreted. I do believe that there is such a thing as cowardice. If I am correct, there are at least two kinds of it: first, a callous, unmixed selfishness; second, a component of psychoneurosis containing fears which an individual could conquer or allay sufficiently to allow him to carry on his duties. I believe, on the other hand, that there are psychoneurotic disorders the symptoms of which an individual cannot conquer or allay sufficiently to allow him to carry on his duties. He is, therefore, not responsible for his failures.

Yet there remains to be described an intangible reality of conduct, for estimating which, as displayed by the individual, psychiatry has neither the moral nor the legal qualifications, a reality which resides in the ethical conscience of a people. I am not certain that civilians are competent to judge or describe the actions of men who have lived a strange and different life, interlaced with the fear of death. I am certain, however, that the men who have endured and who have remained in service in spite of the temptation to seek exit through the wide open portals of psychiatric discharge, have a right to personal opinions and judgments of behaviour which should be respected. The descriptive words they use in relation to men who left them in the teeth of danger and returned to civilian life capable of work and life as they had known it in the past, are perhaps unthinking and certainly often are profane and vulgar. In their unscientific, descriptive terminology, nevertheless, there is a thread of justice and truth. For, to say it once again, nearly all men have fear and know insecurity, frustration and exhaustion, and most of them have known adult tears. Men who stayed in uniform saw other men leave for home because of symptoms which they themselves concealed and endured, which they recognized in themselves as seeds of weakness and cowardice and which they considered it to be their duty to conquer. The symptoms of depression of spirit, anxiety, trembling, sweating, anorexia, sleeplessness and gastro-intestinal upsets with exhaustion, were not sufficient in themselves to make most men choose to desert their fellows. The lack of another quality was necessary and that quality remained on an ethical and moral plane. In the psychoneurotic individual there appears a taint of selfishness, not in terms of avarice or reprehensive acquisitive-

ness, but in terms of disregard for others. These individuals are so concerned with bodily and nervous symptoms, their fears, their hopes, their disappointments, that perception of the value of group sacrifices, personal honour and pride diminishes and vanishes under stress and strain. The psychoneurotic person may have been trained since childhood in habits of selfishness by selfish progenitors who broke their homes because of lack of the spirit of sacrifice, and who perverted parental conduct in a-parental directions. On whom does the responsibility rest: on the patient, on a parent, a grandparent or a great-grandparent? Who can say? However, we can say responsibility must reside in some generation.

That the disease, psychoneurosis, contains ethical defections, which may be conscious or unconscious, the results of habit or example, appears patently obvious to the nonpsychiatric observer. These observers are prone to judge solely in terms of ethics, having little knowledge of the impact of a man's past on his present and future. On the other hand, they appear to have an insight which psychiatry, in its introspection, seems to have lost in a jungle of descriptive words and phrases, an insight into the moral fibre of men at war.

Having seen men with the fear of death in them face danger, most of us who served in the medical departments of the armed services are unwilling to deny that there is such a thing as courage. We were impressed with the relative scarcity of disabling nervous symptoms among forces exposed to privation, hardship and battle outside the continental limits. And yet, on returning from overseas, those of us in the psychiatric departments of naval hospitals of the United States found that we were flooded with patients who were disabled by the functional conditions associated with war. We discovered that these disorders, which had occurred sporadically overseas, and which were controllable by psychiatric management, in this continent were endemic and out of hand. We failed spectacularly in returning men to a full duty status. I am unable to give percentages or even to hazard them. I can only visualize the meagre dribblets of men returning to duty as compared to the flood discharged for psychiatric reasons.

I do not believe that this was a result of our therapeutic inefficiency. The medical departments of our armed forces did not obstruct in any way the application of new techniques or the full use of psychiatric knowledge and personnel. It remained a fact, however, that some concept, some mechanism, some component of the so-called psychoneurotic states for which these men were discharged, failed to function or adequately to respond to care. With the insight into the nature of courage that our duty overseas had given us, I and many others became convinced that we were now dealing with two large divisions of functional disability. One of these was a disease

of psyche, the pathogenesis of which could be traced to evolution of the personality; the other was an ethical defection, loss of military morale. This ethical defect was often indistinguishable from its psychoneurotic counterpart. It mimicked the irresponsible disorders of the mind, resisted psychotherapy and appeared virulently contagious. This amorality of war did not appear to be limited to the psychoneurotic individual, for normal men and women, in and out of military life, appeared tainted with it. Often it appeared to spread from a civilian focus as a secondary, ethical disorder, the complications of which disabled men in a military sense.

The word "morale" is a polite one, the essence of which I am unable to define. I believe that to possess morale one must have a goal for thought and action; that morale contains, or results in, self-confidence, loyalty, trust and honour. In some of its aspects it is the identification of self with a group and its values vary from civilization to civilization, and from time to time in the same people. I prefer to think of it as a moral virtue no different in peace than in war, a virtue charged with fortitude, courage.

Because most of us believe that man bears a moral responsibility for his acts, and because we also believe that these acts can be coloured and interpreted in the light of past conditioning and experience, it is understandable that diseases of psyche and defections of morality can be confused in such a manner that they can be separated with the greatest of difficulty. I am not certain that anyone can separate them in an individual and accurately weigh one against the other. Certainly psychiatry has no scientific test for fraud. It cannot differentiate the malingerer from the psychoneurotic person by an objective method nor can it quantitatively assess the degree of conscious exaggeration of symptoms by one who is troubled with a functional disability. And yet, in dealing with large groups of men, moral virtues and defections become obvious. In the unscientific past, as has been said, the realm of the diseased psyche was unexplored and abnormalities of behaviour were explained solely on moral bases. Now it would appear that the pendulum of psychiatric opinion has swung too far in the direction of man, the biologic automaton, and that psychiatric terminology has been perverted to uses in the field of ethics so that man can neither be cowardly nor weak and so never can be enduring or courageous.

An explicable but tremendous error was made in the first world war by the coining of the term "shell shock". This gave an organic classification to what was thought to be a psychic disorder. Has not psychiatry made a similar mistake in calling many of the functional disorders of this war "psychoneurosis"? In the last few months of combat, the psychiatric department of the United States Navy gave us a new diagnostic label "no disease

(unable to adapt to further service)". I believe that this is the disorder of morale, called very wisely "no disease", which was responsible for a large part of our therapeutic failure. To date, psychiatry has willingly accepted the full responsibility for this failure because it has identified loss of morale with a disease of psyche.

If this confusion continues, we must bear the full consequences. Ethical defects concern the whole of our society and people should know the implications of a disorder, bred in the North American continent, which rendered many thousands of men unfit for combat. This problem did not begin with war, nor will it end now that peace is here. When we weigh the social life of the United States in the balance scales of psychiatry and ethics, we can distinguish the same difficulties that beset the psychiatrist in the armed forces. What part did our brand of civilization play in the unwillingness of men to lose their lives in its defence? How much of the abnormalities of behaviour that fill our prisons and divorce courts, and which break our homes, results from irresponsible disorders of the mind and how much springs directly from moral defects?

Most of us knew too many men, who, with the fear of death in them, nevertheless died. We knew too many old, tired men hanging on beyond their endurance in a young man's war and we saw too many fathers of large families sacrifice their jobs, their futures and their children's right to happiness, not to speak for them and to insist that they did not act as irresponsible automatons. In spite of some behaviouristic and freudian concepts, they demonstrated selflessness and courage. In defense of courage in peace as well as in war, I believe it to be the duty of psychiatry to re-evaluate the functional disabilities of our civilization in the light of ethical principles of conduct as well as from the standpoint of theories related solely to psychogenesis.

The psychoneurotic disabilities of peace which will constitute 50% or more of your future practices do not differ essentially from those encountered in war. Among your patients you will discover those whose disease should be called "no disease", whose illness is a result of selfishness and lack of courage, but among those suffering from functional complaints you will recognize disorders of psyche distinct from ethical defects. I do not believe that we, as men of medicine, are qualified to judge others on an ethical plane but I do believe that it is our duty to scrutinize our personal as well as our national lives as though we were responsible citizens capable of distinguishing right from wrong. With death as the possible reward for possession of morale, the lack of it in battle can be understood. Can we, through some distorted psychiatric concepts, excuse the loss of civilian virtues — morals? Should we disguise our psychiatric failures and thus lose the scientific virtue — truth?

THE CANADIAN MEDICAL ASSOCIATION

Editorial Offices—3640 University Street, Montreal

(Information regarding contributions and advertising will be found on the second page following the reading material.)

EDITORIAL

NATIONAL CANCER INSTITUTE OF CANADA

AT the conclusion of a two-day conference in Ottawa, during January, a National Cancer Institute was launched to co-ordinate all Canadian cancer control work into a concerted, well-financed attack on the disease from every aspect. The Conference was attended by some fifty outstanding men and women in the fields of medicine, science and public affairs. The success of the Conference was due to the efforts of three men in particular, the Honourable Paul Martin, K.C., Minister of National Health and Welfare, Dr. G. D. W. Cameron, Deputy Minister, and Dr. Clarence Routley, General Secretary of our Association, whose administrative experience solved many a knotty problem in the discussions.

The need for co-ordination of effort made the conference not only timely but overdue. The Honourable Mr. Martin put it aptly, saying, "the social instinct of the public is disturbed at the lack of progress being made in cancer control".

Cancer still ranks as the second highest cause of death in Canadian mortality records. During the period of World War II, that is, 1939-1945, close to 80,000 men and women died of cancer, contrasted with 38,834 war casualties, killed and missing. The war cost Canada close to \$19,000,000,000.00. The amount spent on cancer control for the same period amounted to not more than \$5,000,000.00. The comparison is obvious.

Our Canadian attack on cancer has been in the nature of guerrilla skirmishing. The program of the National Cancer Institute calls for total mobilization. This includes not only funds but also educational effort, research workers, and diagnostic and treatment facilities organized into a superb striking force under a united command.

Certain trends have been observed by the Bureau of Statistics to account for the in-

crease in cancer mortality during the fourteen year period 1931-1944:

1. There is an increase in the older age group of the population in Canada (the cancer age).
- (2) 52% of the deaths from cancer were found in the digestive tract and the peritoneum.
- (3) 34.4% of the cancer mortality in women was located in the uterus and breast.
- (4) 16.2% of the cancer mortality in men had its site in the genito-urinary tract.
- (5) Deaths from cancer of the buccal cavity and pharynx, digestive tract and peritoneum, respiratory organs and skin are more common in males than among females.
- (6) Using standardized cancer mortality rates, Quebec showed the highest, 106.8 per 100,000, whereas Prince Edward Island and Saskatchewan had the lowest, 83.6 and 85 per 100,000.

The physicians of Canada are troubled about their ineffectiveness in the war against cancer. Up to the present, practitioners have tried to do their part in educating the public to seek early diagnosis and treatment at the nearest available special centre. From that point on they have been prepared to await the conquest of cancer through a *coup de grâce* delivered by trained laboratory scientists.

There does remain, however, a weapon physicians can use with great effectiveness. We refer to the data learned from epidemiology and case analysis. Physicians are the first group to come in contact with cancer sufferers. If all case records were exhaustively analyzed, some significant lead might be found which could be followed up by a research epidemiologist. By this means alone, some 10,000 physicians could be brought into the field as cancer research workers in Canada.

Once the National Cancer Institute gets into its stride, one of its immediate objectives will be the enlistment of every physician in the preparation of careful case records. This contribution of the men engaged in general practice may prove most fruitful.

In addition to the preparation of more careful case records, physicians throughout Canada should consider it their responsible

duty to submit to the National Cancer Institute any possible angle of attack which might occur to them to meet further cancer control. Any idea related to cancer, no matter how fanciful, should be forwarded to the Institute in sure knowledge that the project will receive careful consideration and due credit given if the idea shows sufficient promise to set up a special study under the supervision of a trained scientist.

To waste no time in getting on with the job while the National Cancer Institute is being legally incorporated, an Interim Committee was appointed by the Conference with power to proceed in dealing with grants and research projects. The members of this Committee are as follows: Dr. A. W. Blair, *Chairman*; Dr. G. E. Richards, *Alternate Chairman*; Dr. Lyman Duff; Dr. L. C. Simard; Mr. J. G. Stephenson; Dr. William Boyd; Dr. J. H. Baillie; Mr. F. G. Butterfield; Dr. H. G. Grant; Dr. Charles Vézina; Dr. C. H. Best; Dr. G. E. Hall; Dr. G. D. W. Cameron. The Executive Secretary of the Interim Committee is Dr. J. L. Little, with temporary headquarters at the Jackson Building, 6th Floor Annex, Ottawa.

With such a Committee, it is confidently expected new shock tactics are going to be employed to control cancer throughout the length and breadth of Canada. J.L.L.

EDITORIAL COMMENTS

Retirement of Dr. Gerald Horner

We learn that Dr. Gerald Horner has relinquished the editorship of the *British Medical Journal*. Dr. Horner has held this post since 1928, and his retirement is a reminder of the high estate to which he attained in editorship. Much of an editor's work is unrecognized, even if it is realized, but the fine standard of medical journalism maintained in the *British Medical Journal* throughout Dr. Horner's direction, is a lasting monument to his ability. In no period has this been more evident than during the last seven years, when the stress of war and rehabilitation added so enormously to his burden. He is succeeded by Dr. Hugh Clegg who has been assistant editor since 1934.

MEDICAL ECONOMICS

INCOME TAX INFORMATION

For the particular benefit of demobilized medical officers who may not be aware of the income tax requirements, the following information is supplied. Income from Service pay and allowances while overseas on the strength of an Overseas Unit outside the Western Hemisphere and for the first six months of service in the Active Service Forces following return to Canada, is not taxable. All other income is, however, subject to income tax, hence any earnings subsequent to release from the Service must be reported to the Inspector of Income Tax.

As practising physicians may claim deductions for professional expenses, it is possible that, in the case of some ex-officers commencing practice late in 1946, professional expense might actually exceed professional income for the period of practice. It is therefore important to know that deductions for professional expenses are admissible only against income from professional services and not against income from any other source.

The practice of making quarterly instalment payments on income tax may be new to certain of our members, and the rule in this connection is as follows:

Individuals whose income — (a) is derived from carrying on a business or profession (other than farming); (b) is derived from investments; or (c) is more than 25% derived from sources other than salary or wages, are required to pay their estimated tax by quarterly installments during such year. Each payment must be sent in with Installment Remittance Form T.7-B Individuals. Any balance of tax is payable with interest with the T-1 General return which is due to be filed on or before April 30 of the succeeding year.

The following timetable indicates the returns required during 1947:

A. Doctors NOT receiving salaries amounting to $\frac{3}{4}$ of income:

Date Due	Forms to be Used
March 31, 1947	T.7-B Individuals, 1947
April 30, 1947	T.1-General, 1946 (NOTE: Doctors should not use T.1 Special regardless of income)
June 30, 1947	T.7-B Individuals, 1947
September 30, 1947	T.7-B Individuals, 1947
December 31, 1947	T.7-B Individuals, 1947

B. Doctors receiving salaries amounting to $\frac{3}{4}$ or more of income:

Date Due	Forms to be Used
April 30, 1947	T.1-General, 1946
Whenever Status is changed*	T.D.-1

* With respect to new employer, marital status, dependents.

Doctors who pay salaries to their own employees should send in Form T-4 by the end of February each year.

For income tax purposes all salaries are net. Therefore doctors must pay tax on the total amount they receive as salary. It has been urged by the Ontario Medical Association that doctors arrange with their employers for such items as automobile costs and medical fees, to be paid either directly by the employer or to the doctor as expenses over and above the salary.

DOMINION INCOME TAX RETURNS BY MEMBERS OF THE MEDICAL PROFESSION

As a matter of guidance to the medical profession and to bring about a greater uniformity in the data to be furnished to the Income Tax Division of the Department of National Revenue in the annual Income Tax Returns to be filed, the following matters are set out:

Income

1. There should be maintained by the doctor an accurate record of income received, both as fees from his profession and by way of investment income. The record should be clear and capable of being readily checked against the return filed. It may be maintained on cards or in books kept for the purpose.

Expenses

2. Under the heading of expenses the following accounts should be maintained and records kept available for checking purposes in support of charges made:

- (a) Medical, surgical and like supplies;
- (b) Office help, nurse, maid and bookkeeper; laundry and malpractice insurance premiums. (It is to be noted that the Income War Tax Act does not allow as a deduction a salary paid by a husband to a wife or vice versa. Such amount, if paid, is to be added back to the income);
- (c) Telephone expenses;
- (d) Assistants' fees;

The names and addresses of the assistants to whom fees are paid should be furnished. This information is to be given each year on Income Tax form known as Form T.4, obtainable from the Inspector of Income Tax.

- (e) Rentals paid;
The name and address of the owner (preferably) or agent of the rented premises should be furnished [see (j)];
- (f) Postage and stationery;
- (g) Depreciation on medical equipment;

The following rates will be allowed provided the total depreciation already charged off has not already extinguished the asset value:

Instruments costing \$50 or under may be taken as an expense and charged off in the year of purchase.

Instruments costing over \$50 are not to be charged off as an expense in the year of purchase but are to be capitalized and charged off rateably over the estimated life of the instrument at depreciation rates of 15 to 25%, as may be determined between the practitioner and the Division according to the character of the instrument, but whatever rate is determined upon will be consistently adhered to;

Office furniture and fixtures—10% per annum.

Library—The cost of new books will be allowed as a charge.

- (h) Depreciation on motor cars on cost:

- Twenty per cent 1st year;
- Twenty per cent 2nd year;
- Twenty per cent 3rd year;
- Twenty per cent 4th year;
- Twenty per cent 5th year;

The allowance is restricted to the car used in professional practice and does not apply to cars for personal use.

For 1940 and subsequent years the maximum cost of motor car on which depreciation will be allowed is \$1,800.

- (i) Automobile expense; (one car)

This account will include cost of licence, oil, gasoline, grease, insurance, garage charges and repairs;

Alternative to (h) and (i) for 1940 and subsequent years:

In lieu of all the foregoing expenses, including depreciation, there may be allowed a charge of 4½c. a mile for mileage covered in the performance of professional duties. Where the car is not used solely for the purpose of earning income the maximum mileage which will be admitted as pertaining to the earning of income will be 75% of the total mileage for the year under consideration.

For 1940 and subsequent years where a chauffeur is employed, partly for business purposes and partly for private purposes, only such proportion of the remuneration of the chauffeur shall be allowed as pertains to the earning of income.

- (j) Proportional expenses of doctors practising from their residence:

- (a) Owned by the doctor.

Where a doctor practises from a house which he owns and as well resides in, a proportionate allowance of house expenses will be given for the study, laboratory, office and waiting room space, on the basis that this space bears to the total space of the residence. The charges cover taxes, light, heat, insurance, repairs, depreciation and interest on mortgage (name and address of mortgagee to be stated);

- (b) Rented by the doctor.

The rent only will be apportioned in-

asmuch as the owner of the premises takes care of all other expenses. The above allowances will not exceed one-third of the total house expenses or rental unless it can be shown that a greater allowance should be made for professional purposes.

- (k) Sundry expenses (not otherwise classified)—The expenses charged to this account should be capable of analyses and supported by records.

Claims for donations paid to charitable organizations will be allowed up to 10% of the net income upon submission of receipts to the Inspector of Income Tax. This is provided for in the Act.

The annual dues paid to governing bodies under which authority to practise is issued and membership association fees,* to be recorded on the return, will be admitted as a charge. The cost of attending postgraduate courses or medical conventions will not be allowed:

- (l) Carrying charges:

The charges for interest paid on money borrowed against securities pledged as collateral security may only be charged against the income from investments and not against professional income.

- (m) Business tax will be allowed as an expense, but Dominion, Provincial or Municipal income tax will not be allowed.

PROFESSIONAL MEN UNDER SALARY CONTRACT

3. It has been held by the Courts that a salary is "net" for Income Tax purposes. The salary of a Doctor is therefore taxable in full without allowance for automobile expenses, annual medical dues,† and other like expenses. If the contract with his employer provides that such expenses are payable by the employer, they will be allowed as an expense to the employer in addition to the salary paid to the assistant.

* We have recently been informed that a memorandum from the Department of National Revenue has advised local Inspectors of Income Tax that, for practising physicians, amounts in excess of \$100.00 under this heading, might be deducted provided that these are regarded as legitimate expenses and proof is submitted that the fees have actually been paid. Fees, such as the fee for certification of the Royal College of Physicians and Surgeons, may be included.

† A recent ruling by Mr. Justice Thorson in the Exchequer Court has established that persons whose income is derived from salary may claim as a deduction for income tax purposes fees paid to the licensing or governing body necessary to maintain them in good standing for purposes of their employment. This ruling applied to salaried doctors permits the deductions of the fees paid to the College of Physicians and Surgeons.

MEN and BOOKS

SOME ESKIMO REMEDIES AND EXPERIENCES OF AN AMATEUR DOCTOR AMONG THE LABRADOR ESKIMO

Rev. F. W. Peacock

Nain, Labrador

In ancient times the shaman or witchdoctor (angaKoK) had the monopoly of healing among the Eskimo, but with the passing of the office of the angaKoK the ordinary people (inuit) became heirs to some of the old remedies used by the angaKut who, incidentally, combined in themselves the office of prophet, priest and doctor.

One hundred and seventy-five years ago the Moravian Mission started work among the Labrador Eskimo. A few of these missionaries were trained medical men, and of the remainder nearly all received some instruction in the use of medicine, many indeed were homeopaths. For a number of years a hospital was operated at OKaK and for a few years a cottage hospital with a resident nurse was operated in Nain with the help and support of the Hudson's Bay Company. But for the past 30 years there has been no resident medical man on the northern part of the Labrador Coast. Doctors from the International Grenfell Association make an annual trip to this part of the Labrador and doctors of the R.C.A.F. have visited the four northern Labrador settlements in response to appeals for help from the Moravian missionaries. The Moravian missionaries with elementary training in medicine and surgery learn much from doctors who visit the coast, and these doctors are willing to impart knowledge to the missionaries because they realize that the health of the Eskimo is in the hands of the missionaries. Nevertheless among the Eskimo, as among villagers in England, and probably Canada, the old fashioned remedies used by "grandmother" or "grandmother's grandmother" still persist. But before we proceed to a brief study of some of these remedies we will note a few of the major diseases of the Eskimo.

The most fatal disease among the Labrador Eskimo is influenza. It is endemic on the Labrador. It occurs among the Eskimo in pandemic form. The pandemics occur with great regularity twice a year, differing from one another in severity and to a less extent in type. Old mission diaries speak of deaths from the prevalent "Eskimo cold" and this was undoubtedly the disease we know as influenza. The pandemics arise annually when the usual mid-winter thaw occurs and in the spring of the year just before the village is cleared of the winter refuse. This mid-winter thaw usu-

ally occurs just after the coldest winter weather; possibly the vitality of the Eskimo is lowered by the cold.

These epidemics are especially virulent about every 20 years. The last of such severe epidemics was in 1943 when in the spring 23 people of the 280 affected died and in the late summer 15 of the 250 affected succumbed.

Tuberculosis is apparently a disease which has been imported. Dr. Samuel King Hutton, M.D., Ch.B.(Vict.) noted in the year 1909 that he was not "aware of the occurrence of tuberculosis as a 'natural' disease among the primitive Eskimo tribes". Dr. Hutton was for a number of years resident at OKaK Hospital. However, tuberculosis is not a widespread cause of death among the Labrador Eskimo. It is however noticeable that with the increased use of the white man's diet there is a greater tendency to tuberculosis among the Labrador Eskimo.

Another major disease among the Eskimos is a pustular skin eruption, known to them as "kallak". This eruption at first suggests scabies, but although dirt irritates the condition I feel certain that it is not responsible for the condition. Dr. S. K. Hutton investigated cases during the years 1903 to 1908 and could find no evidence of the presence of acarus. This eruption coincides with years when there is a lack of seal meat, which suggests to me that it is a deficiency disease.

Finally we must notice the Eskimo's tendency to hæmoptysis and to suppuration. The former condition occurs in apparently strong and healthy Eskimo who show no traces of tuberculosis. It is possible that in such cases hæmoptysis is caused by a scorbutic condition coupled with the breathing of extremely cold air while engaged in the long walks over the hills to trapping grounds.

TREATMENT

The Eskimo treat their own ills as well as obtaining medicine from the missionary. For influenza they make an infusion of *Ledum Palustre* which they drink, a half cupful at a time to induce a sweat and to relieve pain. It is possible that this beverage is not originally an Eskimo remedy since, I understand, such treatment is common in parts of Germany and it is possible that the early German missionaries introduced this remedy. However it must be noted that this remedy is less common among the Labrador Eskimo today than it was formerly.

For hæmoptysis and hæmorrhages from the lungs the Labrador Eskimo made a stew of willow (*salix*) bush skins, but I can find no evidence that this treatment is used nowadays and therefore am unable to discover any dosage.

The Eskimo are great believers in the curative properties of the skins of rodents. The

skin of a freshly killed mouse is placed with the fur out over wounds and is said to effect a cure. Mouse skins are also used as a dressing for glandular swellings. The skin of the arctic hare is widely used in dressing wounds for warmth.

The root of the *Sedum*, after the outer skin has been removed is used internally as an anodyne. Willow buds (*Salix*) are eaten for scorbutic conditions. Another Eskimo remedy for cuts or wounds is the spores of the puff ball (*Lycoperdon gemmatum*). The spores are applied directly to the wound. The exudation of the juniper is also applied to wounds and is claimed to have great healing properties.

The Eskimo have a novel way of removing foreign bodies from the eye. First they obtain a louse, not a difficult matter, a woman's hair is tied to the louse and the louse is placed on the eyeball in order that it may crawl across the eye dragging the hair after it, and the hair removes the foreign body from the eye. This method is said to be almost infallible.

Strangely enough the Eskimo seem to have no remedy for the skin condition referred to as "kallak". Reference should be made to the Eskimo "doctors" (AKiterijut). These men by manipulation and rubbing are reputed to be able to take away pain from an affected part. One commonly hears an Eskimo complain that he has broken a certain part of his body. Although this complaint may be demonstrably false nothing can convince the Eskimo and so he calls in the Eskimo "doctor" who proceeds to mend the break by manipulation and rubbing. Some of these "doctors" are quite rough in their methods and not infrequently one meets those who have suffered considerably after passing through the hands of these AKiterijut. Nevertheless the AKiterijut continue to prosper and find no lack of willing patients.

On the whole the Eskimo do not exhibit any signs of intolerance to the white man's drugs. The one exception, in my experience, is with the sulfa drugs. Given full doses of sulfathiazole, over a period of 48 hours 40% of the Eskimo patients treated show injection of the conjunctiva, while a further 30% show injection after 72 hours' treatment. Of this 70% about 5% do not react to treatment. One of my colleagues in Hebron, Labrador, had considerable success with sulfathiazole with no conjunctival injection when using half the prescribed dosage.

In the year 1942 my wife and I carried out an experiment to determine the effect of vitamins upon Eskimo and half-breed families. This experiment was carried out as a result of general concern regarding the poor health of the Eskimo. We felt that the gradual substitution of white flour and other white man's foods for native meat, fish and berries and the subsequent loss of vitamin constituents might ac-

count for the lowered resistance of the Eskimos to disease and for the prevalency of eye, skin and dental troubles. The high infant mortality and the frequent inability of mothers to feed their babies also gave cause for alarm.

Three large native families were chosen as subjects of the experiment and the family history and each subject's characteristics were noted. The vitamin product used was cerophyl, a natural food, processed for use as a supplement to the human diet. Cerophyl is made from selected leaves of young cereal grasses (wheat, oats and barley) dried and tableted.

The families chosen were the largest Eskimo and half-breed families likely to be settled on the station for the longest period in the spring when the winter hunting season was over. It was necessary to choose large families so that the diet and living conditions of the experimental and control subjects in each of the three groups should be the same. We realized that it would have been desirable to work with a larger number of subjects and over a longer period than the twelve weeks over which the experiment stretched, but we were unable to do this without hindering families from hunting and fishing. The natives followed the directions regarding dosage and we kept weekly records for the experimental and control subjects. Weight, height and chest measurements were taken and a record was kept of each individual's general health, diet and living conditions.

The experiment made it quite obvious that the addition of vitamins did improve the health of the Eskimo although vitamins could not counteract the effect of a diet which, at that time, fell so short in its energy content of that needed by people engaged in active muscular work in a very cold climate. Kallak, the Eskimo skin disease referred to above was almost entirely absent among the experimental subjects while practically every control subject had this skin condition.

We noted above that at the time of this experiment concern was felt because of the inability of mothers to feed their babies. It must also be noted that many Eskimo mothers lactate continuously over a period of many years after the birth of their first child. One woman in Nain has been lactating without cessation for over 10 years, and in spite of this she is extremely robust and strong.

The Europeanization of the Labrador has led to a deterioration in health among the Eskimo, although against this we must place the fact that the Eskimo are more cleanly than they were formerly. Nevertheless in spite of continuous teaching the Labrador Eskimo is still dirty and slow in learning cleanliness. Consanguineous marriages are of course extremely common and it is possible that the high infant mortality rate is in some degree dependent on this fact.

The concentration of the Eskimo into settlements is, I believe, an adverse influence, and the Mission and Government endeavour to persuade the Eskimo to scatter as far as is possible not only for the sake of their health but that they may have a larger area over which to hunt for food. The pure Eskimo are disappearing slowly in Labrador and it would appear that before the turn of this century Labrador will be peopled with breeds. A wise government is making valiant attempts to rehabilitate the Eskimo and to preserve this minority, a task which it is hoped will meet with deserved success.

ASSOCIATION NOTES

l'Association Médicale du Canada, Division de la Province de Québec

La réunion annuelle de l'Association Médicale du Canada, Division de la Province de Québec, aura lieu à la ville de Québec vendredi et samedi, le 18 et 19 avril.

Le Comité local des Arrangements prépare des séances scientifiques aux divers hôpitaux et à l'Université de Laval.

L'assemblée annuelle d'affaires de la Division sera convoquée à 4.30 p.m., vendredi, le 18 avril. Des programmes seront envoyés aux membres plus tard.

Les hôtels disponibles sont: le Château Frontenac; le Clarendon; l'Hôtel St. Louis; l'Hôtel St. Roch; et l'Hôtel Victoria.

Les accommodations doivent être réservées de bonne heure.

Quebec Division

The Annual Meeting of the Canadian Medical Association, Quebec Division, will be held in Quebec City on Friday and Saturday, April 18 and 19.

Scientific sessions are being arranged at the various hospitals and the University of Laval by the local Committee of Arrangements.

The annual business meeting of the Division will be convened at 4.30 p.m. on Friday, April 18. Programs will be mailed to members at a later date.

Hotels available are: the Chateau Frontenac; the Clarendon; St. Louis Hotel; St. Roch Hotel; and the Victoria Hotel.

Reservations should be made early.

The Annual Meeting, 1947

WINNIPEG, the place where the Assiniboine River from the West joins the Red River from the South, has been selected by the Canadian Medical Association for its next convention, to be held from June 23 to 27, 1947.

Arrangements for the convention are practically complete. The Committee on Housing has been able to make reservations for a limited number of rooms at six of the leading hotels and, in addition to this, accommodation is available at the University of Manitoba, Fort Garry. However, it is suggested that reservations be

Sailing to Winnipeg?

For the information of members from Eastern Canada who are planning their journey to the Annual Meeting at Winnipeg, the following schedule of the Canadian Pacific Great Lakes Steamship Service is reproduced:

WESTBOUND

Leave Toronto 2.30 p.m. Tuesday or 2.30 p.m. Saturday.
Arrive Port McNicoll 5.20 p.m. Tuesday or 5.20 p.m. Saturday.
Leave Port McNicoll 5.30 p.m. Tuesday or 5.30 p.m. Saturday.
Arrive Fort William 7.30 a.m. Thursday or 7.30 a.m. Monday.



Winnipeg, looking north on Main Street. The large building in the background is the Royal Alexandra Hotel, the Convention headquarters of the Canadian Medical Association. R.C.A.F. Photograph

made early to the Housing Committee, 602 Medical Arts Building, Winnipeg. Since a record attendance is expected the medical men from Manitoba are making their own arrangements for accommodation, as far as is possible, in order to leave the space available in the hotels to the men from outside the province.

The Program Committee, under the Chairmanship of Dr. F. A. L. Mathewson, has been very active. Their efforts will be reflected in the next issue of the *Journal*.

Leave Fort William 8.10 a.m. Thursday or 8.10 a.m. Monday.
Arrive Winnipeg 7.45 p.m. Thursday or 7.45 p.m. Monday.

EASTBOUND

Leave Winnipeg 8.30 p.m. Friday or 8.30 p.m. Monday.
Arrive Fort William 7.10 a.m. Saturday or 7.10 a.m. Tuesday.

Leave Fort William 11.00 a.m. Saturday or 4.00 p.m. Tuesday.
 Arrive Port McNicoll 6.30 a.m. Monday or 8.30 a.m. Thursday.
 Leave Port McNicoll 8.45 a.m. Monday or 8.45 a.m. Thursday.
 Arrive Toronto 11.30 a.m. Monday or 11.30 a.m. Thursday.

Members from points in Ontario, Quebec or the Maritime Provinces wishing to travel via the Great Lakes should arrive in Toronto either Tuesday or Saturday in time to leave by the C.P.R. Steamship Special at 2.30 p.m. for Port McNicoll.

Canada Steamship Lines, S.S. *Noronic*, also offers a weekly service on the following schedule:

WESTBOUND

Leave Windsor 8.30 a.m. Saturday.
 Leave Sarnia 6.00 p.m. Saturday.
 Arrive Port Arthur 6.30 a.m. Monday.
 C.P.R. or C.N.R. train connections for Winnipeg as above.

EASTBOUND

Leave Port Arthur 12.00 noon Wednesday.
 Arrive Sarnia 8.30 a.m. Friday.

We are informed that very heavy traffic via the Lakes is expected during June and July and members who propose to break the rail journey to Winnipeg by a steamship trip are urged to make reservations with their Canadian Pacific agent without delay.

Identification Certificates have been obtained from the Canadian Passenger Association which entitle members and their families to purchase rail and/or steamship transportation at a special rate of single fare plus one-third. Requests for Identification Certificates should be addressed to the General Secretary, C.M.A., 135 St. Clair Ave. W., Toronto 5.

THE ANNUAL MEETING ROUND TABLE CONFERENCES

For the first hour and a half on each of the three mornings of Wednesday, Thursday and Friday, June 25, 26 and 27, Round Table Conferences will be held at the annual meeting in Winnipeg.

The subjects to be discussed with the names and addresses of the Chairmen are presented hereunder. Members are cordially invited to study this list and submit, in advance in writing, questions or problems or suggestions which they would like to have discussed in any round table.

Please communicate directly with the Chairman of the Conference concerned and do it soon in order that advantage may be taken of your communication in the preparation of the Conference.

ROUND TABLE CONFERENCES

Anæsthesia

Anæsthesia for the Occasional Anæsthetist.

Chairman: **Dr. D. C. Aikenhead**, Medical Arts Building, Winnipeg.

Anæsthesia for Chest Surgery.

Chairman: **Dr. A. C. Rumball**, Deer Lodge Hospital, Winnipeg.

Dermatology

Seborrhæa.

Chairman: **Dr. Norman Wrong**, Medical Arts Building, Toronto, Ont.

Furunculosis.

Chairman: **Dr. A. R. Birt**, Medical Arts Building, Winnipeg.

Ringworm of the Scalp.

Chairman, **Dr. A. M. Davidson**, Medical Arts Building, Winnipeg.

Medicine and Surgery (Joint)

Hypertension (surgical and psychosomatic view points).

Joint Chairmen: **Dr. J. D. Adamson**, Winnipeg General Hospital, Winnipeg, and

Dr. A. C. Abbott, 409 Power Building, Winnipeg.

Medicine, Obstetrics and Gynæcology (Joint)

Endocrine Problems of Puberty, Reproduction and Menopause.

Chairman: **Dr. H. B. VanWyck**, Medical Arts Building, Toronto 5.

Medicine

The Management of Peptic Ulcer.

Chairman: **Dr. Wendell Macleod**, St. Mary's and Vaughan Streets, Winnipeg, Man.

Obstetrics and Gynæcology

Cæsarean Section—the indications and contraindications.

Chairman: **Dr. W. P. Tew**, 4 Hayman Court, London, Ont.

Obstetrics and Pædiatrics (Joint)

The Rh Factor in Obstetrics and Pædiatrics.

Chairman: **Dr. Bruce Chown**, The Children's Hospital of Winnipeg, Winnipeg.

Ophthalmology

Ocular Injuries.

Chairman: **Dr. N. L. Elvin**, Medical Arts Building, Winnipeg.

Otolaryngology

Chronic Otitis Media.

Chairman: **Dr. Robert Black**, Medical Arts Building, Winnipeg.

Otolaryngology and Pædiatrics (Joint)

The Management of Bulbar Poliomyelitis.

Chairman: **Dr. Harold Medovy**, 401 Boyd Building, Winnipeg, Man.

Psychiatry

Treatment in D.V.A. Hospitals—Rehabilitation of Psychiatric Cases, including experience with subshock, insulin, indications, mode of action, results, etc.

Chairman: **Dr. W. M. Musgrove**, Deer Lodge Hospital, Winnipeg.

Electro Encephalography in Psychiatry.

Chairman: **Dr. G. L. Adamson**, St. Mary's and Vaughan Streets, Winnipeg.

Child Psychiatry.

Chairman: **Dr. Alex. Pincock**, Psychopathic Hospital, Winnipeg.

Radiology

Roentgen Therapy in the Treatment of Arthritis (therapy).

Chairman: **Dr. Ethlyn Trapp**, Medical-Dental Building, Vancouver.

Cardio-vascular Roentgenology (diagnostic).

Chairman: **Dr. H. M. Edmison**, 103 Medical Arts Building, Winnipeg.

Surgery

Vascular Disorders of the Lower Extremities.

Chairman: **Dr. C. E. Corrigan**, 307 Waterloo Street, Winnipeg.

Management of Intestinal Obstruction.

Chairman: **Dr. M. E. MacCharles**, 10 Medical Arts Building, Winnipeg.

Urology

Anuria.

Chairman: **Dr. H. D. Morse**, St. Mary's and Vaughan Streets, Winnipeg.

The Role of Antibiotics and Chemotherapy in Urology.

Chairman: **Dr. J. C. McClelland**, Medical Arts Building, Toronto.

Please address your questions to the Chairman.

MEDICAL SOCIETIES

Canadian Association of Radiologists, January 3 to 5

The Mid-winter Session of the Canadian Association of Radiologists took place in Quebec on January 3 to 5 of this year. The total registration was 90 and the sessions at the Laval, St. Sacrement, L'Enfant de Jesus and Hotel Dieu Hospitals were all well attended. The scientific sessions at these hospitals consisted of a series of 10-minute papers with a discussion period of five to ten minutes, and most of these papers were given by the younger members of the Association and by those radiologists who had served with the armed forces.

Thirty papers constituted the scientific program and these were delivered with remarkable efficiency, the content of the papers was excellent, the standard of presentation, high, and in spite of the large number of papers, each session was concluded on time. Presiding over the scientific sessions were: Dr. W. A. Jones, Kingston; Dr. Carleton B. Peirce, Montreal; and Dr. W. Lloyd Ritchie, Montreal. The luncheons and teas furnished by the Sisters at each hospital were very much appreciated. A bus service was arranged to convey those attending the sessions to and from the various hospitals which are a considerable distance apart.

The local Committee under the chairmanship of Dr. Jules Gosselin, assisted by Drs. Mathieu Samson, Henri Lapointe, and other radiologists in Quebec, were responsible for the arrangements, and to them is the satisfaction of having arranged for and conducted the most successful meeting that the Canadian Association of Radiologists has held. The next meeting of the Association will be held at Winnipeg at the time of the Canadian Medical Association Annual Meeting, June 23 to 28.

The Physiological Society of the University of Toronto, November 4, 1946

Dr. J. Talesnik, who is at present pursuing investigations in the Department of Banting and Best Medical Research as a fellow of the Rockefeller Foundation, while on leave of absence from the University of Chile, spoke on November 4 before the Society on the subject "The influence of the thyroid hormone on certain neuro-effector systems, particularly the heart".*

In experimentally induced hyper- and hypothyroid states, pronounced modifications occur in the sensitivities of cardiac and skeletal muscle effector systems to neuro-transmitter substances. The experiments were carried out on isolated mammalian hearts (from the cat, rabbit, dog and guinea pig) and on rat skeletal muscle *in situ*. The isolated hearts of normal animals show great variations in their responses to acetylcholine (AC) injected into the coronary system. This is due to the fact that there are in the heart two types of effectors reacting differently to AC and having variable sensitivities to it. The cardiac muscle fibres are depressed by AC. Cholinergic effectors similar to sympathetic ganglion formations are also present and these respond to AC by liberating an adrenalin-like substance which has a stimulatory effect on the cardiac muscle fibres. These findings, corroborated recently by McDowall and by Haney and Lindgren, may explain the stimulant effect of high doses of AC on the heart.

The work of Burn and his co-workers shows that, on nerve tissue, AC and adrenaline do not act as antagonists, but rather as synergists. Of itself, the adrenaline does not elicit appreciable responses in nerve but modifies the response to AC. The effect of AC is increased by low concentrations, but depressed by high concentrations, of adrenaline. This interrelation of AC-adrenaline is most evident in the ganglia of the sympathetic system. In the perfusion of the superior cervical ganglia the transmission of cholinergic nerve excitation is facilitated by adding adrenaline in low concentration to the saline perfusion fluid. On the other hand, if higher concentrations of adrenaline are added, the ganglionic transmission is either partially or wholly depressed.

In the sympathetic ganglion itself there are tissues (composed possibly of chromaffin cells) which liberate adrenaline, since this substance appears in the perfusate following the stimulation of the preganglionic fibres or the intra-arterial injection of AC. It is supposed that adrenaline is liberated not only in the superior cervical ganglia, but also in other synapses in which AC is a transmitter substance. It is therefore concluded that the adrenaline which is liberated in the heart may modify the action of the AC upon the different effectors.

If thyroid hormone is administered to an animal in intensive dosage over a long period, the cardiac muscle fibres are sensitized to adrenaline. At the same time the myocardium is markedly desensitized to the depressor action of the AC. It is reasonable to think that this is the cause of the weak cardio-depressor response to vagal stimulation which is observed in hyperthyroid animals. An opposite effect on the intracardiac sympathetic structures occurs, since they become sensitized to AC as manifested by increased liberation of adrenaline-like substance following the injection of relatively small quantities of AC. The combination of all these factors would contribute to produce the clinical picture of "hyperthyroid heart".

In thyroid insufficiency the cardiac changes are the antithesis of those found in the hyperthyroid heart. In the hypothyroid animals the myocardium is less sensitive to stimulation by adrenaline and the depression by AC is intensified, as is also the depression produced by stimulation of the vagus. The intracardiac sympathetic structures are relatively insensitive to the action of AC, since there is decreased liberation of adrenaline-like

* An article on this subject by F. Hoffmann, E. J. Hoffmann and J. Talesnik is to appear in the *American Journal of Physiology*.

substance in the heart itself. It would seem that the sum of these factors is responsible for the bradycardia.

Thus adequate sensitivities of the different effectors to AC and to adrenaline seem to be of fundamental importance to the normal functioning of the heart and the hormone of the thyroid gland plays an essential rôle in the regulations of these peripheral mechanisms.

Other structures in addition to the heart appear to be influenced by the thyroid hormone. When rats are in experimentally induced hyper- and hypothyroid states the skeletal muscles show characteristic differences in their responses to indirect stimulation. These observations could be explained in part by the changes in the sensitivities of the muscles to AC.

Physiological Society of the University of Toronto, November 25, 1946

Dr. B. C. P. Jansen spoke before the Society on "The nutritive value of butter, with particular reference to vaccenic acid", on November 25. Dr. Jansen is Professor of Physiological Chemistry in the University of Amsterdam and Director of the Netherlands Institute of Nutrition, and is temporarily exchanging duties with Dr. Bruno Mendel, who is at present in Holland.

In collaboration with Dr. Boer and Dr. Kentie, it was found that the addition of summer butter to the diet produced a greater stimulation of growth in young rats than do vegetable fats such as olive oil; while winter butter gives the same growth response as the vegetable fats. This effect was traced to the fatty acid fraction of the summer butter. The growth-promoting activity is destroyed in hydrogenation but is present in the so-called "saturated" fatty acid fraction obtained by precipitation with lead acetate, according to Twitchell. In 1928 Dr. Bertram of Delft, Holland, showed that the fraction contained a small amount of an unsaturated fatty acid called vaccenic acid, an isomer of oleic acid, to which the formula $C_{11,12}$ octadecenoic acid is assigned. On testing this vaccenic acid it proved to be responsible for the growth-promoting activity of summer butter.

Vaccenic acid, prepared in an entirely different way from Chinese wood oil by partial hydrogenation, was found to have the same growth-stimulating activity as vaccenic acid.

Physiological Society of the University of Toronto, December 9, 1946.

Dr. T. H. Jukes of the Lederle Laboratories Division of the American Cyanamid Company, Pearl River, New York, on December 9, addressed the Society on the subject "Pteroylglutamic acid ('folic acid', 'vitamin Bc') and its nutritional significance".

Dr. Jukes described the varied investigations of many workers which culminated in the isolation, characterization and synthesis of pteroylglutamic acid by a group of scientists in the laboratories of the American Cyanamid Company. Pteroylglutamic acid is a water-soluble, crystalline compound which can be split into glutamic acid, para-amino benzoic acid and a pteridine nucleus. The newly synthesized vitamin may be regarded as the most physiologically active member of a family of vitamins, comprising folic acid, pteroyltriglutamic acid, vitamin M, vitamin Bc, liver L. Casei factor, Norit eluate factor and others. There are certain differences in chemical constitution and in physiological properties between the members of the family. Now that the constitution of the central member has been established, the chemical nomenclature, where it can be applied, is to be preferred.

It has been shown that pteroylglutamic acid is an important factor in animal nutrition and it may be expected that it will also be found necessary for the nutrition of normal human beings. The anti-pernicious anaemia factor or hæmatinic principle of liver extracts

is physiologically related to pteroylglutamic acid, although the two are not identical.

When used in the treatment of pernicious anaemia, pteroylglutamic acid administered *per os* produces marked improvement in the blood picture and in the clinical condition of the patients. There are, however, certain differences in the responses, and the best results at present appear to be obtained by treatment with both the pteroylglutamic acid and liver extract.

Pteroylglutamic acid therapy appears to be specific in the treatment of the anaemias of sprue and the macrocytic anaemias of infancy, pregnancy and pellagra.

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec le vendredi, 6 décembre, 1946.

L'ACIDITÉ GASTRIQUE DANS L'ULCÈRE DUODÉNAL. — S. LeBlond et Jean Rousseau.

L'ulcère duodénal isolé de l'ulcère d'estomac, par Bucquoy en 1887, est devenu une maladie fréquente surtout depuis la guerre. Tous les auteurs sont d'accord pour affirmer qu'il existe de l'hyperchlorhydrie. 24 cas ont été étudiés plus spécialement à l'Hôpital des Anciens Combattants. L'hyperchlorhydrie s'est révélée dans 22 cas. L'hyperacidité totale dans 10 cas seulement. Les éléments diagnostiques consistent surtout dans l'histoire du malade et les constatations radiologiques. Le chimisme gastrique n'apporte aucun élément nouveau tant diagnostique que thérapeutique.

Devrait-il être mis de côté?

ANESTHÉSIE INTRA-RACHIDIENNE PAR LA METHODE DE DOSES SUCCESSIVES ET FRACTIONNÉES. — Bernard Paradis.

1ère partie. Nous avons exposé la technique que nous avons employée. Elle se rapproche de celle de son fondateur Lemmon, mais elle en diffère par la solution employée, qui est une solution à 0.3% de pontocaine hyperbare (parfois hypobare, selon la technique de Lund et Cameron) pour la 1ère injection, et de plus en plus diluée pour les injections subséquentes. Jamais l'on ne donne d'analeptique de routine, mais de l'oxygène pour toutes les interventions hautes où le sympathique cardiaque est atteint, et pendant toute l'intervention; les statistiques des cas présentés sont très bonnes.

2ème partie. Discussion physiologique des résultats obtenus: Explication physiologique de l'absence de complications post-anesthésiques importantes, genre paraplégie, sequelle nerveuse, etc., et théorie émise de la réaction méningée ou de l'anoxémie dans la cause des céphalés.

LA MYOCARDITE RHUMATISMALE ET SON ASPECT ÉLECTROCARDIOGRAPHIQUE. — Jean Fortier.

La myocardite rhumatismale survient dans 95% des cas de rhumatisme articulaire aigu, que celui-ci évolue à l'état torpide ou franchement. Les signes de cette atteinte myocardique peuvent être cependant très discrets et souvent, sans l'aide de l'électrocardiographie, le diagnostic en sera impossible. Une brève revue des signes cliniques et radiologiques est faite. Les différentes modifications électrocardiographiques sont étudiées plus longuement. Pour terminer, l'auteur rapporte quatre observations de myocardite rhumatismale ayant évolué différemment au point de vue clinique et surtout électrocardiographique. Les modifications du tracé représentent sensiblement toutes celles que l'on rencontrera couramment. Certaines conclusions sont tirées.

CONSIDÉRATIONS SUR DEUX CAS D'ÉPIPLOÏTE. — J. L. Petitclerc et Cajetan Gauthier.

Nous avons traité deux cas d'épiplôite, dont un cas d'épiplôite aiguë à staphylocoque et un cas d'épiplôite chronique de type plastique. Tous deux se sont présentés sous la forme d'une large masse tumorale qui

a atteint des proportions considérables en l'espace de quelques heures. Le traitement a consisté dans l'excision de ces larges tumeurs; toutes deux étaient intimement accolées au péritoine, au colon transverse et à l'intession grêle. Le premier cas était une d'épiloïte aigue purulente qui est apparue sans cause apparente, chez un patient qui a présenté plusieurs manifestations staphylococciques antérieures; l'hypothèse d'un diverticule comme agent causal est plausible parce que nous avons fermé un petit orifice sur une des anses du grêle. Le malade a bien guéri de cette pathologie

sans séquelle apparente. Dans le deuxième cas, l'épiloïte est apparue après une appendicectomie et diverticulotomie. Nous avons enlevé cette masse et il a fallu intervenir à deux reprises chez ce patient pour adhérences post-opératoires causant de l'occlusion intestinale au niveau de l'intestin grêle. Ce malade est amélioré mais il présente un syndrome de sub-occlusion intermittente. Peut-être faudra-t-il un jour recourir à une résection de l'intestin grêle là où siègent toujours les lésions amenant l'occlusion.

CANADIAN MEDICAL WAR SERVICES

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE DECEMBER 1946

(Previous sections in January, March, April, May, June July, September, October November and December, 1945 and January, March, May, June, July, August September, October, November and December, 1946 and January, February, 1947.)

SECTION LXXXVIII

Name	Address	Date struck off strength	Name	Address	Date struck off strength
Adilman, B.	406 Ave. "D" S., Saskatoon	2-11-46	Leblanc, L. G.	37 Second Ave. E., North Bay, Ont.	1-11-46
Akin, F. L.	Windsor, Hants Co., N.S.	4-7-46	Livingstone, A. G.	Waskatenau, Alta.	18-10-46
Appleyard, H. E.	20 Orchard Hill, Hamilton, Ont.	28-10-46	Lloyd, F. P.	Cobourg, Ont.	8-6-46
Attundu, C. A.	72-2nd Ave., Ville de St. Pierre, Que.	4-11-46	Lochead, J. R.	5532 Trans Island Ave., Montreal	1-10-46
Beauchamp, L. E.	9904-113 St., Edmonton	26-10-46	Loveseth, L. J.	10717-83rd Ave., Edmonton	29-10-46
Boyd, D. M.	Royal Jubilee Hosp., Victoria	9-11-46	McFetridge, J. D.	Middle Musquodoboit, N.S.	22-2-46
Brown, K. A.	157 Northcliffe Blvd., Toronto	2-12-46	McGibbon, R. H.	Montreal General Hospital	21-8-46
Bulmer, H. R.	59 King Georges Rd., Toronto	2-11-46	M'Gonigle, R. H.	St. Andrews, N.B.	22-11-46
Campbell, J. G. D.	407 Brunswick Ave., Halifax	4-10-46	McKean, H. R.	102 Brunswick St., Truro, N.S.	24-10-46
Cantelon, G. W.	2055 Richmond St., Windsor, Ont.	18-12-45	MacKewan, W. R.	6544 Balsam St., Vancouver	9-10-46
Caplan, H.	3498 City Hall Ave., Montreal	31-5-46	MacKinnon, H. N.	1621-17A St. E., Calgary	7-11-46
Christianson, R. A.		6-11-46	McNichol, J. W.	254 Bay St. W., Hamilton, Ont.	26-9-46
Christopherson, E.	Stanley Park Manor Apt., Vancouver	29-10-46	Marfleet, T. L.	Marwayne, Alta.	3-12-46
Davis, M.	11631-95A St., Edmonton	1-11-46	Mercier, R.	79 D'Aiguillon St., Quebec	22-10-46
Delahaye, A. L.	Royal Victoria Hosp., Montreal	13-11-46	Muir, D. M.	Shelbourne, N.S.	1-10-46
Dennis, J. W.	444 Fourth St., Medicine Hat, Alta.	9-11-46	Mustille, A.	2298 Harvard Ave., N.D.G., Montreal	6-9-46
Dix, G. W.	Scarboro P.O., Ont.	16-11-46	O'Keefe, J. M.	518 Agnes St., Winnipeg	8-11-46
Dvorkin, J.	535-15th Ave., Calgary	22-10-46	Osborne, D. F.	475 Dominion St., Winnipeg	9-11-46
Edgar, M. L.	Royal Jubilee Hospital, Victoria	29-10-46	Piuzé, Y. E.	4297 Western, Westmount, Que.	1-11-46
Edwards, W. S.	281 Elgin St., Ottawa	28-9-45	Plamondon, C. A. G.	78 Monk Ave., Quebec	19-10-46
Fraser, W. A.	Victoria	22-7-46	Porter, D. F. W.	158 Germain St., Saint John, N.B.	28-8-46
Fry, W. H.	12 Peel St., Brantford, Ont.	13-11-46	Rawson, N. R.	408 Oxford St., Winnipeg	5-11-46
Gaulton, G. C. B.	17 St. Paul St., Saint John, N.B.	1-11-46	Rice, D. A.	1280-4th Ave. S., Lethbridge, Alta.	23-10-46
Gervais, R.	St. Paul, Montmagny Co., Que.	28-10-46	Rotenberg, H.	334 Ruton Rd., Toronto	13-11-46
Goodman, J. M.	Limerick, Sask.	6-11-46	Samuels, A. J.	10224-121st St., Edmonton	29-10-46
Gorman, F. J. A.	246 Campbell St., Winnipeg	29-10-46	Sedgwick, W. S.	14 Willowbank Blvd., Toronto	16-11-46
Goulet, F.	St. Honore Shenley, Beauce Co., Que.	25-2-46	Sestrap, L.	Weyburn, Sask.	28-11-46
Green, K.	Box 583, Prince Rupert, B.C.	8-10-46	Sherban, A. J.	Hafford, Sask.	28-11-46
Grisdale, L. C.	156 Carling Ave., Ottawa	23-10-46	Simpson, R. E.	1751 Haro St., Vancouver	8-11-46
Hall, H. K.	4738 W. 6th Ave., Vancouver	16-2-46	Skwarok, E. W.	9948-88th Ave., Edmonton	13-11-46
Hayward, R.	1087 Spruce St., Winnipeg	3-9-46	Smyth, M. P.	2377 Dundas St. W., Toronto	26-10-46
Herman, B. G.	61 Lyndhurst Ave., Toronto	1-11-46	Squires, F. J.	713 Fleet Ave., Winnipeg	17-9-46
Horan, P. J.	Southside Rd. W., St. John's, Nfld.	29-10-46	Stockton, W. H. S.	1531 Davie St., Vancouver	7-12-45
Hugill, J. T.	11154-83rd Ave., Edmonton	26-10-46	Thibault, J.	St. Camille, Que.	25-11-46
Hutcheon, D. E.	117 Evelyn Cres., Toronto	13-11-46	Trott, A. W. J.	9938-108th St., Edmonton	22-11-46
Kerr, D. L.	506 Prince Albert Ave., Westmount, Que.	30-11-46	Warran, S. A.	333 Palmerston Blvd., Toronto	7-11-46
Koegler, S. J.	18 McDougall Ave., Waterloo, Ont.	7-11-46	Warren, D. A.	771 Main St. E., Hamilton, Ont.	20-7-46
Larue, A.	47 Fraser St., Levis, Que.	16-10-46	Wightman, K. J. R.	78 Gosvener St., Toronto	4-10-45
			Willisroft, B. A.	883 Seventh Ave., Owen Sound, Ont.	27-11-45
			Wilson, G. B.	138 W. 21st St., North Vancouver	22-11-46
			Wilson, W. M. G.	242 Victoria St., Kamloops, B.C.	24-11-45
			Yollick, B.	345 Euclid Ave., Toronto	15-11-46

CORRESPONDENCE

Health Insurance in Austria

To the Editor:

The following translation of a newspaper clipping from *Die Presse*, Vienna, December 25, 1946, is of interest in medical economics.

"*Demands of the physicians of Styria.*—In full agreement with the Austrian Medical Association the physician of Styria reject decidedly the proposal made by Health Insurance officials to employ a limited number of practitioners on salary, and to restrict specialists' services to out-door clinics. They demand free choice of doctors and fee for service payment. Furthermore the College of Physicians and Surgeons of Styria wants Health Insurance limited to those below a certain income ceiling so that the benefits obtainable by those of very limited means are not likewise extended to patients in high income brackets. This demand is explained by the fact that the capitation fee which the Styrian practitioners are paid under the present Health Insurance scheme is exceedingly small. It means that a practitioner receives a trifle more than four Austrian Schilling* for attending a patient for a period of three months. Therefore the profession in Styria demands at least a share of 25% of the Health Insurance contributions."

It should be explained that health insurance was instituted in Austria several years before World War I, as a matter of fact Austria was one of the first European countries to adopt this "Made in Germany" idea. One cannot therefore rightly assert that health insurance is in Austria still in an experimental or transitional state. Styria is an Austrian province with a population of about 1,000,000.

Provost, Alta.

A. F. PERL, M.D.

* At present rate of exchange four Austrian Schilling are equivalent to 40c (forty cents) in our currency.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

THE COLLEGES INTERVENE

The outlook for the forthcoming negotiations concerning the National Health Service has been considerably modified for the better by correspondence that has passed between the Presidents of the three Royal Colleges (surgeons, physicians and obstetricians) and the Minister of Health.

The initiative was taken by the Presidents who wrote to the Minister asking for clarification on the three outstanding features of the Service that were causing apprehension to the profession: the method of remuneration; the absence of any right of appeal to the courts against a decision of the Minister expelling a practitioner from the Service; and the apparent lack of liberty of movement of practitioners from one area of the country to another. In his reply the Minister has expressed his willingness to "negotiate freely" within the terms of the Act. He has also pointed out that "the resumption of discussions now would not prejudice" the final decision that every doctor will need to take as to whether he wishes to enter the new service.

This conciliatory attitude has been reciprocated by the British Medical Association, and at a special representative meeting which is just about to be held as this letter is written, a resolution is to be presented to the effect that the Association will enter into negotiations with the Minister on condition that the discussions will be comprehensive and that the possibility is not excluded that they may lead to further legislation. This resolution has already been approved by the doctors of

Manchester and Swansea, and there is every reason to believe that it will be adopted by the representative meeting.

Doubts have been expressed as to the wisdom of considering further legislation on this matter. As certain sections of the Labour Party have already pointed out, "if a bill can be altered in one direction it can be altered in another". In other words, if the matter comes before Parliament again, the Minister might not be so successful in restraining those members of his party who strongly urge a full-time medical service under direct government control.

MEDICAL OFFICERS OF HEALTH

The public health doctor, or medical officer of health, has become such a well established part of our medical services that it is difficult to realize that it is only a hundred years since the first one was appointed in this country. This was Dr. W. H. Duncan who was appointed medical officer of health in Liverpool. A quarter of a century was to pass before such an appointment was made obligatory upon every sanitary authority in the country. The progress in public health that has been made since those days constitutes one of the most striking features in the history of the 19th century. Indeed, their work is taken so much for granted that there is a tendency to overlook the tremendous debt this island country of ours owes to these estimable members of the profession. The mere fact that even a minor epidemic of enteric fever provokes such a popular outcry is the most effective compliment that could be paid to the efficiency of their work.

Their task has seldom been easy. Their fellow-practitioners have often tended to belittle them as mere "office-wallahs", whilst local authorities have all too often resented suggestions that more of the ratepayers' money should be spent on schemes for improving the health of the community. Today, however, all that is changed, and, thanks largely to the valiant efforts of the pioneers in the service, the "M.O.H." is now recognized as a key-man in the struggle against disease. In the forthcoming National Health Service his status will be that of a specialist.

NEW ABSTRACTING JOURNALS

With commendable punctuality the British Medical Association has issued the first number of two new journals—*Abstracts of World Medicine* and *Abstracts of World Surgery, Obstetrics and Gynaecology*. These will fill a long-felt want in medical literature, in helping the harassed clinician to keep in touch with steadily increasing numbers of medical journals. The very fact that it has been necessary to publish two separate journals for the purpose is some indication of the magnitude of the task. To have produced two such journals under present day conditions is a feat of which the editors have every reason to be proud. Both journals are to be published monthly.

EMERGENCY BED SERVICE

One of the major problems for the general practitioner in London is to find a bed in hospital for a case of emergency. All too often this involves telephoning several hospitals before one is found that has a vacant bed. In 1938 the King Edward's Hospital Fund for London instituted an emergency bed service. A twenty-four hours' service was provided, so that all a doctor had to do to get his patient into hospital as an emergency was to telephone the offices of the service, and within a matter of minutes he would be informed where his patient could be admitted. During the war the service played a valuable rôle in the organization of the emergency hospital service for the London area. Since the end of the war it has been reorganized, and it is now announced that once again it is providing a twenty-four hours' service for the doctors of London. That it fulfilled a useful rôle is shown by the fact that since its inception it has dealt with a total of over 40,000 calls.

AMALGAMATION OF EYE HOSPITALS

A noteworthy advance in postgraduate facilities has just been announced. As from the beginning of the year three famous eye hospitals—the Royal London Ophthalmic Hospital (Moorfields Eye Hospital), the Royal Westminster Ophthalmic Hospital and the Central London Ophthalmic Hospital—have become one corporate body under the title of Moorfields Westminster and Central Eye Hospital. Under the new scheme 341 beds will be available for in-patients and there will be facilities for dealing with 90,000 new out-patients each year. As these clinical facilities will be available to the Ophthalmic Institute, one of the federated institutes of the University of London, it is clear that this new development will provide outstanding opportunities for research as well as for postgraduate instruction. London, February, 1947.

WILLIAM A. R. THOMSON

The Holland Letter

(From our own correspondent in Holland)

NEW FEES FOR THE DUTCH DOCTORS

In Holland two-thirds of the population are members of an assurance institute or foundation, that procures them all necessary medical help and aid. Only persons earning less than 3,750 guilders a year (about 1,250 dollars) can be affiliated with such a foundation. They may choose the doctor they want, they can take another physician twice a year, if they wish medical assistance by another doctor.

They are entitled to all kinds of medical help; they can visit the doctor at his home, but the doctor has to come if the patients want him to do it, even if it is not necessary at all. Medical help by specialists, if judged necessary by the house-physician is provided too.

During the last years the limit of revenues for those who wanted to affiliate to an assurance foundation for medical help was brought from fl. 2,200 to fl. 3,000 and recently even to fl. 3,750. Consequently the number of the people, not belonging to a foundation decreased. These persons used to pay the doctor fl. 2.50 (1 dollar) for every treatment or visit. The income of the doctor was not raised during and after the war, on the contrary, the number of people paying their visits directly to their physician was reduced.

For every person, affiliated to a foundation for medical mutual assistance and aid, a certain amount was paid to the doctor, chosen by the patient. Up to 2,500 persons in a town or village could choose one doctor for their permanent medical aid. Four guilders (1.50 dollar) a year was paid to the doctor for the patients, who had inscribed for his regular medical aid.

Now the doctors have broken their existing contracts with the foundations, saying that the increase of the cost of living, accompanied with the decrease in their income by the fact that there were fewer persons than formerly paying for every treatment, made it necessary that existing contracts be renewed and brought on a level in accordance with the raising of the cost of living, also for the doctors.

The 6,300 Dutch doctors, who had contracts with the foundations, are now waiting the results of the negotiations by the representatives of the government, the doctors and the assurance foundations. Spokesmen of the government have declared that a greater fee, granted by the foundations to the doctors will be necessary, in view of the increased cost of living. But the Dutch doctors, always faithful servants of the state and their fellow-citizens, hope that now their demands will be recognized.

MALNUTRITION-CEDEMA IN INDONESIA

The excretion of creatinine in the urine of healthy Indonesians was compared with the excretion in patients with malnutrition-œdema. After the Japanese occupation many thousands of Indonesians were found to be suffering from malnutrition-œdema. The total creatinine

excretion and the creatinine coefficients were found to be very low in the œdema patients.

LIGHT CASES OF ERYTHROBLASTOSIS FETALIS

Dr. S. I. de Vries, internist at the university clinics for obstetrics and gynaecology of Prof. M. A. van Bouwdijk Bastiaanse at Amsterdam, made a research on the Rh factor on children born in the university clinics. A complete morphological blood test was done on children, whose mother was Rh positive, to get an idea about the number of reticulocytes normally present. The same examination was performed on apparently normal Rh positive neonati, whose mother was Rh negative. In a very high percentage of the cases the blood picture showed the characteristics of a hæmolytic anæmia, whereas the number of reticulocytes was significantly increased. Besides it was possible to demonstrate the presence of Rhesus antibodies in the maternal blood.

These mild cases of erythroblastosis fetalis confirm the opinion that the etiology of this disease is closely connected with a Rhesus antagonism.

THE CAUSES OF HEMOPTYSIS

In a survey of the underlying diseases causing hæmoptysis during the years 1941 to 1946, Dr. J. C. Gerrits at Amsterdam, remarks that besides pulmonary tuberculosis chronic tracheobronchitis was an important etiological factor. The frequent occurrence of a chronic tracheobronchitis with hæmoptysis during the winter of 1945-46 was caused by influenza infection.

NEW EDITOR-IN-CHIEF OF THE "DUTCH MEDICAL JOURNAL"

Prof. dr. G. van Rijnberk, editor of the *Dutch Medical Journal* during 33 years was rewarded the gold medal of the *Dutch Medical Journal* for all his work on behalf of the Dutch Medical Press and the Dutch physicians. Dr. D. Klinkert will replace Prof. van Rijnberk as editor of the *Dutch Medical Journal*.

ELECTRON MICROSCOPE

In the laboratories for technical physics in the Technical High School at Delft a new electron microscope was constructed by ir. J. B. le Poole. Simplifications in the models known up till now will reduce the cost of the instrument.

CANADIAN AMBASSADOR REPRESENTS PROF. BEST OF TORONTO

The title of doctor honoris causa was granted to Prof. Best of the University of Toronto on the occasion of the dies natalis (birthday) of the University of Amsterdam on January 8, 1947.

Prof. Best, who could not be present at the ceremony was represented by the Canadian Ambassador to the Netherlands, the Right Hon. Mr. Dupuys.

Amsterdam,

J. Z. BARUCH

January 21, 1947.

* Revolutions are more rapidly effected in the arts than in the minds. A new process, a new discovery in practical science progresses more in a decade than does a new thought in ten.—Osler.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Problems Arising in the Treatment of Syphilis with Penicillin. Hill, W. R.: *New England J. Med.*, 235: 919, 1946.

The observations recorded were from a series of 125 patients with various types of syphilis treated at the Massachusetts General Hospital. The patients were hospitalized; treatment was from 8 to 15 days, and a total dosage of 1,200,000 to 2,400,000 units was given by intramuscular injection, in doses of 20,000 to 40,000 units every three hours. Arsenicals and bismuth were not used but treatment in most patients having interstitial keratitis or neurosyphilis was supplemented by fever therapy. Penicillin resistance was encountered in patients with persistently positive serological reactions adequately treated with arsenicals and bismuth. Two patients of 3 with interstitial keratitis treated with penicillin alone were improved; 2 others in which malarial or typhoid fever therapy was used as adjunct were not improved. Three patients with advanced optic atrophy and 1 with 8th nerve deafness were not improved. One case with extensive destruction from gummatous syphilis of the face was not improved by the maximum dosage of penicillin but was cleared up with malarial fever therapy. In early cutaneous syphilis the author did not encounter penicillin resistance. Reference is made to Moore's observation that when penicillin alone is administered in early syphilis the rate of relapse is in direct relation to the total dose given intramuscularly in a period of 7½ days; also the report by the Committee on Medical Research of the U.S.P.H.S. that the lowest cumulative failure rate (15% at the end of 11 months' follow up) occurred after a total dosage of 2,400,000 units, whereas after 60,000 units the rate was 62%. While serological and clinical relapse occurred in the author's series, amounting to about 7%, between the 3rd and 9th month, the danger period extended to the end of the second year after treatment.

One instance of what Schoch and Alexander have called "ping pong syphilis" was observed. A male patient with positive dark-field was treated, and one month later his wife developed, while sero-negative, a vulvar lesion. She received penicillin treatment and 3 weeks later her husband developed another primary lesion in a different site from his former lesion. The husband had evidently been cured after infecting his wife, who in turn reinfected him. In relapse and re-infection retreatment requires at least double the previous dose, reinforced by arsenic and bismuth.

Herxheimer reactions occurred in 75% of patients treated for early syphilis. It has also been stated that Herxheimer reactions occur in 20% of cases of late syphilis treated with penicillin. The risk of abortion in treating early syphilis in pregnant women is mentioned. The risk of incurring the therapeutic paradox in cardiovascular and hepatic syphilis and the hazards of intrathecal use of penicillin are also referred to. Sensitization reactions, urticarial, vesicular and desquamative, were not frequently observed.

From the public health aspect the risk of masking syphilis when gonorrhoea is treated by penicillin in a patient with pre-serological and pre-clinical syphilis is a serious one. The indiscriminate use of penicillin in undiagnosed mucocutaneous ulcerations is also a dangerous practice. Case-holding in patients treated with penicillin has been found far more difficult. The patient who received an injection at each visit is much more likely to attend regularly than the patient who is only "looked at" and has a blood-specimen drawn at each visit. The necessary follow-up of veterans who have received penicillin treatment will largely be the task of the private physician. The principles of this important procedure and the reasons therefor are carefully outlined. The question of marriage in the penicillin-

treated patient is summed up by the author's advice that marriage should be postponed until 2 years have elapsed during which the blood has been persistently negative and no clinical symptoms have appeared. This probationary period should be concluded with a negative report on the spinal fluid. D. E. H. CLEVELAND

Pulmonary Tuberculosis and Pregnancy. Cohen, R. C.: *Brit. J. Tuberc. & Dis. Chest*, 40: 10, 1946.

The author reviews the literature from the experimental, clinical and statistical aspect, pointing out that the majority of investigators comment favourably regarding the prognosis in such cases. The importance of adequate data on which to base one's observations, however, is emphasized.

In a case of active tuberculous disease the decision *re* subsequent management should be delayed until the third month. If the prognosis, so far as the lesion is concerned, is considered favourable on adequate treatment, the pregnancy is allowed to continue. In more active cases with questionable prognosis, based on the lesion alone, an individualistic attitude is adopted and such factors as social status, reaction to previous pregnancies, intelligence and co-operation of the patient is considered.

A report is made on 177 consecutive patients with pulmonary tuberculosis who were confined. The management of these cases and infants, is discussed. Quiescent cases are encouraged to live an active sanatorium type of life. More active cases require adequate rest with or without collapse therapy. *Re* infants: post-natal infection is considered a real danger and care *re* masks is emphasized. Breast feeding is allowed only in very exceptional cases.

The results of 3 groups of cases are discussed, there being 13% retrogression, the latter being defined as any unfavourable laboratory or x-ray changes observed within three months of labour. Approximately one-half the patients who retrogressed were under 30 years of age and three-quarters were primipara. Of the patients on collapse therapy 4.7% retrogressed, and those who were on conservative treatment, 9.6%.

Comments are made on the follow-up of both mother and child, emphasis being placed upon the importance of facilities for treatment and supervision, pointing out that the worse cases have been those in which tuberculosis was unrecognized or neglected during pregnancy. Cases of active pulmonary tuberculosis with complicating tuberculous laryngitis are considered poor risks.

Changes in the diaphragmatic level and the use of pneumoperitoneum, also changes in tuberculin sensitivity, and the use of therapeutic abortion, are discussed. The latter was thought to be justified only if with proper treatment and supervision favourable progress of pulmonary tuberculosis could not be anticipated. The crucial circumstance that decided whether pregnancy would have a harmful effect or not was whether the tuberculous condition could be controlled.

J. B. ROBINSON

Diagnostic and Therapeutic Considerations of Gastro-intestinal Bleeding. Jones, C. M.: *New England J. Med.*, 235: 773, 1946.

Proper treatment of gastro-intestinal bleeding depends upon an accurate determination of the site and character of the hæmorrhage. The immediate treatment consists in overcoming the effects of blood loss, best done through the use of whole blood by gravity-drip transfusion, to be followed by adequate management of the causal lesion.

It is of primary importance to determine whether treatment should be medical or surgical. All cases should be considered from three points of view, the site of bleeding, the mechanism underlying the hæmorrhage and the condition of the patient.

A careful history will often give the diagnosis while physical findings may or may not be helpful. In most cases of gastro-intestinal bleeding roentgenologic studies should be carried out, without manipulation, within twenty-four to forty-eight hours of its occurrence.

Gastroscopy, œsophagoscopy and sigmoidoscopy, if indicated, should be postponed until bleeding ceases and, when bleeding is from the lower bowel, sigmoidoscopy should precede a barium enema.

The adequate management of gastro-intestinal bleeding requires the close co-operation of a well trained roentgenologist and competent surgeon.

NORMAN S. SKINNER

Roentgenologic Examination in Patients with Bleeding from the Gastro-intestinal Tract. Schatzi, R.: *New England J. Med.*, 235: 783, 1946.

In the majority of cases of gastro-intestinal bleeding the roentgenologist has the responsibility of demonstrating the anatomic lesion causing the hæmorrhage and this demonstration is often made difficult by the condition of the patient. The procedure varies somewhat from case to case, being an individual problem of investigation to be decided upon by careful consultation between the physician in charge and the roentgenologist.

In the absence of any clinical clue regarding the site of bleeding a scout film of the abdomen and examination of the large intestine should precede that of the œsophagus, stomach and duodenum. A careful study of the small intestine would complete the x-ray investigation.

In the majority of cases of massive hæmorrhage it is clinically evident that the lesion lies in the upper part of the gastro-intestinal tract. In these cases early x-ray study is indicated, not only because of the possible necessity of surgical intervention, but also to demonstrate a peptic ulcer which may heal and disappear relatively quickly. While it is usually preferable to delay such study until twenty-four to forty-eight hours after cessation of bleeding certain cases should be done earlier.

Since a watery suspension of barium sulphate does not stimulate peristalsis or secretion to the same extent as food the author has no hesitation in administering it and examining patients shortly after bleeding has stopped, provided shock is not present. In the absence of shock certain cases are examined even before hæmorrhage has ceased. Palpation is dispensed with, the patient being kept in the horizontal position and gravity (turning the patient from side to side) being used to distribute the barium. Spot films are considered invaluable.

NORMAN S. SKINNER

Treatment of Mental Illness at Home by Small Doses of Insulin. Cohen, N.: *New England J. Med.*, 235: 612, 1946.

Insulin in sufficient dosage to produce mild hypoglycæmia (usually 50 to 90 units), given daily in the home under careful medical supervision, forms a valuable method of therapy for a wide variety of mental disorders. Such treatment may need to be prolonged over a period of several weeks but may achieve good results in cases which have failed to respond to more drastic methods, such as electroconvulsive therapy.

Insulin injections are given six times weekly with the patient fasting. The dose is gradually increased until mild hypoglycæmic shock occurs. Coma is purposely avoided, the patient is kept up and about and psychotherapy, in the form of discussion with the patient, is employed in the early phases of hypoglycæmia. After a variable length of time the hypoglycæmia is terminated by feeding the patient.

Twelve case reports are presented and, in view of the favourable results obtained, further use of this treatment is advocated.

NORMAN S. SKINNER

Treatment of Tuberculosis with Streptomycin. Hinshaw, H. S. et al.: *J. Am. M. Ass.*, 132: 778, 1946.

This article is a summary of observations on 100 patients who had various types of tuberculosis treated during a 2-year period. The clinical use of streptomycin appears to be based on sound laboratory investigation. It possesses the pharmacologic properties required of a substance to be used in the treatment of chronic

disease, but it is expensive to produce and difficult to procure in a quantity adequate for the treatment of tuberculosis.

Of 12 patients with miliary tuberculosis and tuberculous meningitis treated with streptomycin 6 died, one had just started treatment and the other 5 unmistakably improved within one or two weeks and have been observed for from 2 to 10 months. The spinal fluid improved more slowly and some abnormalities persist. More time must elapse before any of these patients will be classified as cured. Residual neurologic disturbances, blindness, deafness, disturbed cerebellar function are present in 3 out of 4 patients with arrested tuberculous meningitis.

Those that are living were treated with 100 to 200 mgm. streptomycin by lumbar or cisternal puncture every 24 to 48 hours for 2 to 6 weeks and 2 to 3 gm. daily intramuscularly for 6 months.

Thirty-two cases of progressive pulmonary tuberculosis were treated with 1 to 3 gm. per day for from 2 to 6 months. Roentgenographic improvement was observed in 25. Sputum conversion occurred in 13. Reactivation of the disease attending discontinuance of treatment with streptomycin has been observed in 6 cases; 5 patients died.

There was prompt improvement in 5 out of 7 cases with ulcerating tuberculous lesions including larynx, hypopharynx, trachea and the large bronchi and 4 of these had no recurrence for one year. Tuberculous empyema was not improved by streptomycin. Streptomycin appeared to facilitate the healing of tuberculous tracts especially those due to tuberculosis of the chest wall and tuberculous lymphadenitis. Treatment should be continued for several weeks after purulent drainage ceases, to reduce the possibility of recurrence. The average dose is 2 gm. per day for 3 or 4 months.

Streptomycin possesses some palliative value in tuberculous cystitis but is not curative of renal tuberculosis and therefore cannot be regarded as a substitute for the surgical treatment of unilateral renal tuberculosis.

The dosage of streptomycin recommended for tuberculosis of adults is from 1 to 3 gm. per 24 hours divided into 4 or 6 doses one of which is administered every 4 to 6 hours intramuscularly; total requirement about 360 gm. The solution for parenteral administration may contain 100 to 250 mgm. per c.c. sterile water. Used as an aerosol spray, solutions contain 25 to 100 mgm. per c.c.

Streptomycin when used for a long time, as in treatment of tuberculosis, produces reactions, the most frequent and uncomfortable of which is a disturbance of equilibrium. This often persists for several weeks after discontinuation of the drug.

Treatment with this antibiotic should be postponed or denied to those tuberculous patients who are making satisfactory progress. It is not to be regarded as a substitute for other and proved effective forms of treatment of tuberculosis.

L. M. SPRATT

The Preponderance of Right Hydrothorax in Congestive Heart Failure. McPeak, E. M. and Levine, S. A.: *Ann. Int. Med.*, 25: 916, 1946.

The distribution of hydrothorax in congestive heart failure was determined in three groups of patients by three methods respectively, i.e., by thoracentesis, radio-scopic, and at autopsy. The findings obtained from these three analyses were in close general agreement throughout the study.

Depending on the method considered, right hydrothorax predominated in from 56 to 80% of cases and left hydrothorax in from 12 to 17%. Fluid was equally distributed in 3 to 27%. When etiological groups of heart disease were considered, the predominance of right hydrothorax over left was maintained regardless of the underlying heart condition. Rheumatic heart disease and auricular fibrillation appeared to augment the influences determining a right hydrothorax, while pure left heart failure tended to mitigate these to a limited degree.

Any explanation for the distribution of hydrothorax in congestive heart failure may be attempted according to the authors, only through consideration of a number of influencing factors. However it is clear that the balance of these forces is exerted in such a manner as greatly to favour the involvement of the right pleural sac.

S. R. TOWNSEND

Dicoumarol Therapy. Levan, J. B.: *Ann. Int. Med.*, **25**: 941, 1946.

The author concludes from his studies that; (1) Dicoumarol is an effective anticoagulant. (2) The initial dosage of 300 mgm. the first day, and 200 mgm. the second day is the most suitable schedule for inducing hypoprothrombinemia. (3) Maintenance dosage is variable even in the same individual, and the daily plasma prothrombin time is the only index of the drug's action. (4) Hemorrhage is the only toxic action of dicoumarol. It can be controlled by fresh blood or vitamin K. (5) Absolute contraindications for use of dicoumarol are renal insufficiency, hepatic damage, bacterial endocarditis, purpura, bleeding tendencies, and recent brain or cord injury. Relative contraindications are ulcers, open wounds, faulty absorption of vitamin K as found in gastric, biliary, or bowel damage, and emaciation.

S. R. TOWNSEND

Eosinophilia in Malignant Tumours: Its Significance.

Isaacson, N. H. and Rapaport, P.: *Ann. Int. Med.*, **25**: 893, 1946.

Nineteen cases of pronounced eosinophilia associated with malignant tumours are reviewed from the literature. To these are added 15 cases, making a total of 34. In 90% of all the cases, metastases were present, and in an additional 7% they were suspected but not proved. In only one was metastasis neither demonstrated or suspected. That dissemination may have been present though not clinically manifest is possible, as illustrated by two of the author's cases. Eosinophilia when associated with malignant tumour, with other causes ruled out, is indicative of dissemination of the malignant process.

The prevailing theories as to the pathogenesis of eosinophilia in malignant tumours are discussed. No definite cause has been established as yet.

S. R. TOWNSEND

Diagnosis and Treatment of Skin Manifestations of Capillary Fragility. Peck, S. M. and Copley, A. L.: *New England J. Med.*, **235**: 900, 1946.

The subject is discussed under 6 headings: vascular anatomy of the skin, with special reference to the site of capillary reactions; the method of testing capillary fragility; the mechanism of capillary fragility; the clinical manifestations of capillary fragility as part of general diseases and as purely dermatological conditions; the relations of capillary fragility tests to clinical diagnosis; and treatment.

The authors consider that the numerous methods employed for evaluating capillary resistance are too general and subject to too many variables. They consider that an intradermal venom test, using that of the moccasin standardized by its effect on the vascular bed of the chick embryo is more accurate and gives valuable information in thrombocytopenic purpura and symptomatic purpura. Among the mechanisms of capillary fragility are mentioned the hypothesis that capillaries and minute vessels surrounded by tissue containing hyaluronic acid, and when this is liquefied by hyaluronidase activity the walls of the minute vessels lose their adequate support and rupture from intravascular pressure; the rôle of the elastic fibres in the tissue surrounding the minute vessels; and the loss of or inability of endothelial cells to secrete continually the necessary interendothelial cement substance. From the different mechanisms of capillary hemorrhage discussed it is argued that a single therapeutic approach to secure hemostasis cannot counteract the manifestations of capillary fragility.

The factors influencing capillary resistance are classified as those directly damaging the endothelium such as poisons, toxins of various diseases, metabolic products, vitamin deficiencies, those affecting endothelium indirectly, including physiological variations such as menstruation and endocrinal disturbances and diseases of the spleen and the reticulo-endothelial system. Cutaneous diseases such as drug-eruptions, Majocchi's disease, angiooma serpiginosum, Schamberg's disease, Kaposi's disease, Osler's disease, among many others manifest a capillary fragility.

The generally accepted classification of hemorrhagic diseases into those in which there is abnormal clotting-mechanism does not take into account such significant phenomena as the physical properties and adhesiveness of blood-clots, and recognizes only one mechanism of clotting-blood-coagulation. It has been shown however that either the agglutination of platelets or the formation of fibrin with simultaneous or subsequent blood coagulation, and not necessarily always a combination of both phenomena, forms wound thrombi with resultant hemostasis.

Except in clinical or subclinical scurvy large doses of ascorbic acid have been successful in disturbances due to capillary fragility. Clinical results with vitamin P have been equally discouraging. In thrombocytopenic purpura splenectomy is the most promising form of treatment and snake venom therapy only a palliative. The intracutaneous venom test however has prognostic value in selecting cases for splenectomy.

D. E. H. CLEVELAND

Lumbar Puncture Reactions: Relative Importance of Physiological and Psychological Factors. Redlich, F. C., Moore, B. F. and Kinbell, I.: *Psychosom. Med.*, **8**: 386, 1946.

One hundred hospitalized psychiatric patients were punctured routinely. From this random group were excluded all patients with gross deterioration, extreme psychotic states and contraindications to spinal puncture. Alternate patients were punctured with No. 16 and No 22 gauge needles. Other conditions were standardized.

In the two groups punctured with different needles patients were found to be well matched with respect to diagnosis, age, sex, and rating as to intelligence, mood, emotional stability, chronic anxiety, and hypochondriacal trends. The patients' knowledge of the procedure and its underlying principles were evaluated. This proved as low as their anticipatory anxiety was high. Before the puncture about half of the patients had heard of someone who had undergone the test and 23% knew of ill effects in others.

Fifty-four per cent of the total showed some lumbar puncture symptoms. In the 16 needle group 74% reacted unfavourably as compared with the 52% in the 22 needle group. Five times as many severe reactions occurred with the large needle and the duration of symptoms was markedly longer.

The occurrence of symptoms had no significant relationship to the intelligence and emotional stability of the patient. Persons with normal mood seemed to suffer more severe headaches than those who were depressed or elated. The presence of chronic anxiety of hypochondriasis evidently predisposed to a slight increase in complications, but there was no increase in the number of severe reactions.

Some increase in mild reactions was associated with anxiety with regard to the procedure. Unlike the intrinsic personality traits of the patients, which did not significantly affect reactions, knowledge of ill-effects in other does increase post lumbar puncture sequelae to a statistically significant degree. Hence suggestion appears to be the primary psychological factor in the production of symptoms.

The conclusion was reached that drainage is the most significant factor in the production of symptoms following lumbar puncture, outweighing by far the small contribution of anxiety, hypochondriasis and other emotional elements.

PRESTON ROBB

Radiation Treatment of Localized Malignant Lymphoma. Holmes, G. W. and Schulz, M. D.: *New England J. Med.*, **235**: 789, 1946.

Malignant tumours of lymphoid tissue may arise in various parts of the body and usually progress rapidly to a fatal termination, the average duration of life after their appearance being two to three years. Cure depends upon complete removal or destruction of the primary tumour before it has spread beyond its immediate site.

Of five hundred cases of malignant lymphoma, collected from the records of the Massachusetts General and Collis P. Huntington Memorial hospitals, 15 were found to be living and free of disease more than five years after the last course of treatment. These 15 patients had all had localized malignant lymphoma and had been treated by irradiation (three by radium). The location of the tumour, while of some importance, was not a predominant factor in survival. In four cases the lesion was in the abdomen, in five in the peripheral lymph nodes and the location was varied in the remainder. The degree of malignancy was of no importance.

It is concluded that localization of malignant lymphoma is a most important factor in suggesting a favourable prognosis. Apparent cure in such cases can be obtained by irradiation or surgical removal if tumour destruction is complete. It is wise to employ the maximum amount of radiation which the tissues will tolerate without undue damage.

NORMAN S. SKINNER

Surgery

The Pyruvic Acid Method in Deep Clinical Burns.

Connor, G. J. and Harvey, S. C.: *Ann. Surg.*, **124**: 799, 1946.

The objective in the treatment of the local lesion is closure of the wound as soon as possible. Early split skin grafting is a major goal. Grafting is delayed by the presence of slough. The early removal of slough is thus of signal importance. Preliminary experiments indicated that separation of slough can be hastened if the pH on the surface of the wound can be lowered, proper attention being paid to other chemical factors. Pyruvic acid was found to possess advantages over a large series of organic and inorganic acids when used to separate burn sloughs.

A mixture of pyruvic acid solution having a pH of 1.9 and corn-starch are made into a paste (see original article). A large amount of paste is applied over the burned area to minimize neutralization by wound fluids. The paste is covered with vaseline gauze to prevent drying. Preliminary debridement is not necessary. Separation of the slough proceeds from the margin. It is advisable to incise the slough to create more "margins". The paste does not increase the depth of the burn. It is wise to give morphine or codeia about 15 minutes prior to the first dressing. Dressings should be done at 2 or 3 day intervals. In third degree burns not involving tendons or thick fascia, the wound should be ready for grafting in about a week. The slough is separated by a plane of cleavage beneath the dead tissue. It is not digested.

Properly applied pyruvic acid dressings will allow grafting to be done in 10 to 12 days. It is probable that few bacteria multiply and many will not live at the concentration of hydrogen ions present in the pyruvic acid paste.

STUART GORDON

Acute Pancreatitis. Pueston, C. B., Looby, W. E. and Risley, T. E.: *Am. J. Surg.*, **72**: 818, 1946.

The histories, symptoms and signs of a series of cases of acute pancreatitis operated upon were studied. Faith is expressed in the results of the serum amylase test. If the serum amylase is definitely elevated the differential diagnosis is materially easier, for it rises sharply in the early stages of acute pancreatitis, and is not elevated in perforated duodenal ulcer. This is important, since it is better not to operate upon cases of

uncomplicated pancreatitis. The usual history of acute abdominal pain of varying intensity, tenderness and rigidity in the upper abdomen, may have been preceded by previous milder attacks or biliary colic. Leucocytosis is marked. Glycosuria and albuminuria are frequent.

Treatment is rest in bed, relief from pain, continuous gastric suction, parenteral fluids and careful observation. Biliary tract surgery should be considered after the patient has recovered. Late drainage of a pancreatic abscess may be indicated.

BURNS PLEWES

Causalgia. Ulmer, J. L. and Mayfield, F. H.: *Surg., Gyn. & Obst.*, **83**: 789, 1946.

In a series of 1,477 nerve injuries, 75 cases of severe burning pain and hyperæsthesia associated with tropic and vasomotor changes are reported. All were the result of incomplete nerve injury resulting from shell fragment or bullet wounds. Most wounds were proximal to the knee or elbow. The burning pain developed at varying intervals from within forty-eight hours to two months after wounding was exacerbated by the slightest emotional or physical disturbance, and all were relieved by thoracic or lumbar sympathectomy. All patients were irritable, critical, showed no interest in family or friends so that the disability appeared to be functional, but without exception a return to a normal, stable personality followed the relief of pain. Vasomotor disturbances were of two types: vasoconstrictor and vasodilator.

Procaine block of the appropriate sympathetic chain is considered a necessary preliminary to sympathectomy as a diagnostic procedure. Relief from pain for one to three hours following this enables studies of the nerve damage to be carried out. Repeated procaine block alone did not result in cure of the causalgia. Resection of the injured segment of nerve will give relief, but not neurolysis or periarterial sympathectomy.

Sympathectomy should be done early to prevent psychic trauma and crippling joint stiffness as a result of prolonged pain.

BURNS PLEWES

Combined Abdominothoracic Approach for Carcinoma of Cardia and Lower Oesophagus. Garlock, J. H.: *Surg., Gyn. & Obst.*, **83**: 737, 1946.

Since the physiology of an open thoracotomy has become better understood, surgeons are less fearful of opening the pleura. The author here describes the result of many years' study and experiment by himself and others, and the result is a comparatively simple operation to expose the lower third of the oesophagus, the cardiac portion of the stomach, and if necessary, the celiac axis, spleen and tail of the pancreas.

The short left upper rectus incision is made first to enable manual exploration of the abdomen to determine operability. If no metastases are found, the incision is continued upward and laterally along the eighth intercostal space. The diaphragm is then incised to the oesophageal opening. Through such an incision, a very thorough operation for carcinoma may be done under direct vision. The closure of this incision is described in detail.

BURNS PLEWES

Primary Retroperitoneal Tumours. Donnelly, B. A.: *Surg., Gyn. & Obst.*, **83**: 705, 1946.

Tumours arising behind the peritoneum and between the lumbar and iliac regions are often tumours of the adrenal, pancreas or kidney, or metastatic from primary tumours elsewhere, but there is also a group of primary tumours probably originating from remnants of the urogenital ridge. These latter tumours may be solid or cystic, white, yellow or red, single or multiple, benign or malignant. Sarcomas are most frequent, lipomas forming the bulk of the benign tumours though tending to undergo malignant change in this situation. The same tendency is noted among the leiomyomas. Lymphangiomas are rare. Retroperitoneal cysts of urogenital origin occur most often in women between 15 and 25 years and on the left side. It is the belief of the author that retroperitoneal tumours occur far more

frequently than would be inferred from the scant literature on the subject.

Symptoms are usually vague digestive disturbances with loss of weight and strength, but sometimes the first complaint is acute: peritonitis, hæmorrhage, obstruction, or even uræmia from ureteral obstruction. Aid in diagnosis may be obtained from retrograde pyelograms and gastrointestinal series.

Treatment generally involves use of both surgery and x-ray therapy. Though perhaps more shocking, a better exposure and more successful removal is generally achieved by a transperitoneal approach. The mortality rate of the operation is between 15 and 20%. Most authors recommend postoperative radiotherapy, and consider retroperitoneal malignant tumours to be radio-sensitive. Metastases occur in the liver, lungs, vertebrae and lymph nodes most frequently, and local recurrence is common even when the tumour is histologically benign.

This review includes a report of 95 cases from the University of Iowa Hospitals and an extensive survey of the literature. BURNS PLEWES

Progress in the Treatment of Acute Appendicitis.

Meyer, K. A., Requarth, W. H. and Kozoll, D. D.: *Am. J. Surg.*, 72: 830, 1946.

Reviewing over five thousand cases of acute appendicitis at Cook County Hospital, where a high proportion of cases enter hospital late and only after efforts at self-medication, the authors give statistical support for several conclusions. Cases of acute appendiceal abscess treated without operation show three-quarters the mortality of those operated upon. The McBurney incision resulted in a lesser mortality than either the right rectus or midline. Drainage of the peritoneal cavity resulted in a higher percentage of deaths than closure of the peritoneum. Drains down to the peritoneum lessened the incidence of wound infection. The number of deaths from perforated appendicitis has decreased since the use of chemotherapy.

The technique of operation is discussed and emphasis placed upon the advantages of the following: spinal anaesthesia, inversion of the stump with non-absorbable suture, peritonealization of raw surfaces, silk and steel interrupted suture closure, early ambulation, intragastric suction and avoiding peristaltic stimulants.

BURNS PLEWES

The Treatment of Acute Perforation of Duodenal Ulcer.

Graham, R. R.: *Am. J. Surg.*, 72: 802, 1946.

A series of 130 consecutive perforated duodenal ulcers with a mortality of 10% is reported. One hundred and twenty-five cases were operated upon with a mortality of 6%. Only 7 of these cases were females.

Diagnosis was sometimes difficult. Serum amylase was always elevated in acute pancreatitis. Coronary occlusion is marked by increasing pain, whereas the pain of a perforated ulcer diminishes somewhat after the very severe onset. One case in the series showed a leukopenia of 3,400. The author's trinity of signs and symptoms of intraperitoneal irritation was confirmed: association of pain and tenderness; one point of maximum tenderness; pain on rolling over in bed. When in doubt, a gridiron incision in the right iliac fossa is made, since it is harmless and less subject to postoperative hernia, and a diagnosis can be made through it.

Operation should consist only in closure of the perforation. Time spent in rendering the patient better able to stand the operation by intravenous fluids, oxygen and rest, even though some hours elapse, is never regretted. Barely are pathogenic organisms grown from the peritoneal fluid swab at operation. Spinal anaesthesia is strongly recommended. Three interrupted sutures are used to hold an omental graft over the perforation and the abdomen is closed without drainage. Postoperatively the stomach is kept empty with a Levine tube and fluid and chemical balance maintained. The two duodenal fistulas which occurred closed quickly after acidifying the duodenal contents with a N/10 HCl drip according to Potter's technique.

If the patient is not doing well after operation, a Levine tube and a rectal examination are the first moves. The occurrence of subphrenic abscess is discussed. "The operation is so simple that it can be done by any medical man who has had even a modest training in surgical technique . . . it is unwise to transport a patient suffering from an acute perforation of a duodenal ulcer over long distances. . . ." BURNS PLEWES

Arteriovenous Aneurysms of the Scalp and Face.

Dandy, W. E.: *Arch. Surg.*, 52: 1, 1946.

Superficial arteriovenous aneurysms are not common. They may be found anywhere but the majority occur in the scalp and face. Some three hundred cases have been reported previously to which the author contributes nine additional cases. Of these one was a superficial aneurysm of both upper and lower eyelids completely closing the eye, one each had lesions of ear and forehead, and five cases had scalp aneurysms. Diagnosis was greatly aided by roentgenograms which showed the widened tortuous paths of dilated middle meningeal arteries.

There are two sources of origin of this condition. The majority arise congenitally but may not make their appearance until the later years of life. The other factor may be trauma establishing a trans-cranial connection to a congenital subcranial lesion (one case).

The fact that many superficial aneurysms in and around the face have an arterial supply from the middle meningeal artery even in the absence of a subcranial lesion explains the poor results from ligation of scalp arteries. Ligation of the external carotid makes no impression on the pulsations of the mass.

The safest and best treatment of large extracranial angiomatous masses consists in the extirpation of the central mass. Large dilated veins which always radiate from the periphery tend to collapse when the arterial supply is removed. When a large cranial perforation admits passage of a communicating artery the bone is exposed and the vessels waxed, or in some cases, exposed on the dura. The electrocautery is indispensable in these cases. Good results in some cases have been reported by the injection of sclerosing solutions into the central mass. This treatment would be more hazardous in the presence of an intracranial component. Ligation of the external carotid artery is sometimes necessary, and in some cases ligation of both internal and external carotids of one side are preliminary procedures before removal of the aneurysm itself.

It is worth noting that of the nine cases presented, one operation was performed in only three instances, four cases requiring two-stage procedures, and two cases were operated on in three stages. In all nine cases there were no recurrences. One case died two and a half years postoperatively, the remaining being alive and well for periods varying up to thirteen years. RUPERT WARREN

Expedient Care of Full Thickness Burn Wounds by Surgical Excision and Grafting.

Cope, O., Langohr, J. L., Moore, F. D. and Webster, R. C.: *Ann. Surg.*, 125: 1, 1947.

Inevitable contamination of the burn wound should be prevented from developing into an infectious process by prompt removal of necrotic tissue. Multiplication and invasion of bacterial organisms is rapid. Direct surgical excision is the only method of removal of necrotic tissue that can be done quickly enough to obviate the development of infection. Such surgery is limited by threatening physiologic imbalance, a meagre amount of donor skin, and the inability to recognize with certainty full-thickness destruction of skin. Prompt and adequate shock therapy thwarts physiologic imbalance; experience lessens the quandary *re* depth of burn. Ideal treatment consists in excision of the full-thickness wound destruction with the first hours, with immediate closure by split-thickness grafts. Three categories of patients treated by excision and grafting are described.

Circumscribed full-thickness burns excised and grafted within the first hours form one category. The results in 10 cases are reported. The largest area treated did

not exceed 3% of the body surface. In no case was the total burned area greater than 10%. Destruction was not deeper than subcutaneous fascia. Results were best in this group. Final healing occurred with a minimum of scarring, keloid, contractures, and disability. Average hospitalization was 34.6 days. Sulfadiazine was given to two patients, penicillin to the remainder. Whether chemotherapy had a chance to play a beneficial rôle in this group is questioned. Circumscribed full-thickness burns in which excision and grafting were delayed form the second category. The results in 11 patients are reported. The largest area treated was 9%. Total burned area did not exceed 12%. Treatment was delayed because of active invasive infection. Chemotherapy was instituted in all. Subsidence of inflammation was observed prior to excision. Virtually complete take was obtained in 9 grafts. Inadequate tension and immobilization, and sepsis accounted for lack of success in remainder. Final outcome varied. Some wounds became keloidal. It is an impression that keloid and scarring are roughly proportionate to the amount of pre-existing infection. The average hospitalization was 44 days.

Extensive full-thickness burns of recent origin constitute the third group. Thirty areas in 17 patients were treated. The area of full-thickness burn varied from 1 to 38%. Total burn area from 5 to 72%. The largest wound treated at one operation was 12%. Penicillin was given to all this group. Initial operation varied from 1 to 35 days after injury. In some cases the interval was caused by continued physiologic imbalance; in others it was arbitrary in an attempt to evaluate the usefulness of penicillin in holding infection in abeyance. The final outcome varied. Deep scarring and contractures occurred where there was prolonged infection. Good healing, with minimal scar and keloid formation took place in those grafted within the first week. Average hospitalization was 87 days.

Important points in treatment are, (1) assessment of the depth of destruction, (2) chemotherapy, (3) technical details (anæsthesia, control of hæmorrhage, width and depth of excision and condition of grafting base), and (4) hæmostasis.

STUART GORDON

Pathology and Physiology of Struma Ovarii. Smith, F. G.: *Arch. Surg.*, 53: 603, 1946.

Struma ovarii is a rare type of tumour in which thyroid tissue is a major constituent. A microscopic portion of thyroid tissue develops fairly frequently in ovarian dermoids. The struma in ovarian tumours are obvious teratomas, containing besides thyroid, such tissues as skin, teeth, brain and intestinal epithelium. Others consist entirely of thyroid in association with a cystoma.

The author records 152 cases of this type of tumour recorded in the literature, with one of his own in a woman, 58 years of age. A solid tumour of the left ovary was found at operation, weighing 45 gm. On microscopical examination this showed remnants of ovary, differentiated thyroid tissue, thyroid adenoma and small foci of osseous formation. The tumour exhibited not only the differentiated architecture of adult thyroid tissue but also the proliferation and disorganization of a malignant thyroid adenoma. The malignant nature of the growth was clearly shown by the numerous blood vessels containing tumour cells.

Tumours of the ovary containing thyroid are of three general varieties: dermoids with thyroid, 50%; cystoma with thyroid, 31%, and pure thyroid, 17%. Thyroid tissue has also been observed in association with chronic carcinoma of the ovary and with a Brenner tumour.

G. E. LEARMONTH

An Experimental Study in Wound Healing in Vitamin C Depleted Human Subjects. Wolfer, J. A., Farmer, C. J., Carroll, W. W. and Manshardt, D. O.: *Surg., Gyn. & Obst.*, 84: 1, 1947.

Human volunteers on a diet deficient in vitamin C were subjected to a wound of the thigh and from these and control subjects, biopsies were taken. The degree

of deficiency was determined by ascorbic acid saturation tests. The weights required to rupture the specimens at the original wound were carefully measured.

These ascorbic acid depleted subjects showed about 50% diminution in tensile strength of their healing wounds three to fourteen days after the wound was made. If there was increased tension or decreased blood supply, there was gross failure of primary wound healing. There was evidence that ascorbic acid was necessary for maximum resistance to wound infection. Microscopically, the healing wounds showed lack of collagen and reticulum.

BURNS PLEWES

Unrecognized Vesical-Neck Obstruction in Women. Jacobson, C. E.: *New England J. Med.*, 235: 645, 1946.

Chronic vesical-neck obstruction in the female is more common than is generally recognized and should always be thought of in every case of chronic cystitis, especially in older women. Symptoms are similar to those in men. Frequency and nocturia are usually marked. There may be difficulty in initiating urination, dysuria and urgency, even to the point of incontinence. Symptoms are usually of long duration.

Determination of the residual urine is perhaps the most significant single diagnostic test. Resection of the vesical neck is indicated if residual urine is present.

If treatment is not instituted early in the presence of chronic vesical-neck obstruction there is great danger of dilatation of the upper urinary system. The ideal treatment is to remove all the obstructing tissue or to resect the entire vesical neck. Frequently, however, it is sufficient to resect the posterior vesical lip or median bar. Sphincterotomy or incision of the posterior vesical lip usually gives only temporary relief.

NORMAN S. SKINNER

Plastic Surgery

Ankylosis of the Coronoid Process of the Mandible.

Brown, J. B., Peterson, L., Cannon, B. and Lischer, C.: *Plastic & Recons. Surg.*, 1: 277, 1946.

Fibrous tissue formation, or comminution of bone with fixation, following gun shot wounds about the coronoid process may result in ankylosis of the mandible.

Treatment varies according to the extent and the cause. It includes active movement and exercises using a rubber block, forcible dilation of jaw blocking the mouth open, section of fibrous tissue and blocking, and resection of the jaw below the ankylosis creating a false joint.

One of the foremost causes of trismus is the formation of fibrous adhesions about the coronoid process. Intervention may cause more scar formation. Intra-oral flaps or skin grafts are not satisfactory. Superficial scar bands can be lengthened by a Z-plasty. Dilation under anæsthesia, transverse incision of the scar, and blocking the mouth open for three weeks frequently helps. A dilating appliance must be used following removal of the block. In some instances of soft tissue fixation it is necessary to remove the coronoid process. In widespread deep scarring it may be necessary to remove a section of the scar and create a false joint. Large metallic foreign bodies in kinetic areas may cause trismus. If so, they should be removed.

Bony ankylosis of the coronoid requires removal of the coronoid and sufficient of surrounding displaced bone to prevent reunion. Excessive bleeding is controlled by packing. The intra-oral approach avoids postoperative complications due to injury of the facial nerve or parotid gland. Postoperative jaw exercises are of paramount importance in gaining normal function. The use of a rubber block, and active motion usually suffice.

STUART GORDON

Plastic Problems in the Hand. Bunnell, S.: *Plastic & Recons. Surg.*, 1: 265, 1946.

Factors requiring special consideration in planning plastic repair of the hand are: (1) the nutrition of the hand is supplied longitudinally and through a narrow

wrist; (2) the hand is a mobile organ and not to be restricted by lines of scar; (3) it is a tactile organ; (4) it contains important deep structures and (5) it is prone to stiffen.

Cicatrix should first be excised and replaced by good pedicle skin. At the second operation, for repair of deep structures, the deep scar is excised. Excising all scar and thoroughly freeing skin borders improves nutrition of every structure in the hand. If flexion contracture is present and the skin whitens on stretching the primary cause of the contracture is in the skin. If the skin does not whiten the deep scarring is primary. Size of the skin defect is ascertained by comparing with a normal hand held in similar position.

The skin of the hand is so fashioned that it covers the hand without strain no matter what the position. The total area of dorsal skin of the hand and fingers is one-third greater on making a fist. Incisions should parallel wrinkles or creases and never cross them at or near a right angle. A median longitudinal incision anywhere in the hand is pernicious. Whenever the border of a graft must cross a flexion crease at a right angle, a zigzag or curved line should be made. A scar should not parallel a web. Instead, a long tongue of graft should be laid across the web. A scar along the mid-lateral line of the fingers may become almost invisible. Back or front of this it will thicken and contract. Longitudinal scars about the wrist will thicken and contract. A graft on the dorsum of a finger should follow the mid-lateral line on each side, or the borders zigzagged. All dissections of the hand should be done under the ischaemia of a pneumatic tourniquet. Incisions paralleling tendons cause adhesions to the tendons their full length.

The hand is a specialized organ for stereognosis. The pulps of the thumb and first three fingers are the eyes of the hand. Sensation should be saved in these areas whenever possible. If a finger has to be amputated its volar skin, with its vessels and nerves, should be used as a pedicle graft to a digit in need of tactile covering.

Too prolonged splinting stiffens hands, particularly if they are swollen. All hand wounds should be closed as soon as possible. Open pedicle grafting should never be done in the hand. For all but deep burns resurfacing should be done under chemotherapy at the time of granulations, or later after a temporary thin skin graft has been used. Exercise should be started early after grafting to prevent stiffening. Tightly flexed proximal interphalangeal joints may be arthrodesed in semiflexion. Deformed nails and matrices may be substituted for by free skin grafts.

If all digits have been amputated, the metacarpals may be phalangized. Opposition or remaining digits may be obtained by rotatory osteotomy through the bases of their metacarpals. Additional strength should be given these digits by transferring to their tendons those of the unused muscles in the forearm. Loss of thumb may be repaired by transferring the index finger; or it may be reconstructed by tube pedicle and graft.

STUART GORDON

Surgical Correction of Nasal Deformities. Byars L. T.: *Surg., Gyn. & Obst.*, 84: 65, 1947.

The nose is the most prominent feature of the face. Most corrections of nasal appearance depend on shifting the inter-relationship of its component parts, or changing their size and shape. To this end, a description of the external and supportive anatomy is given.

A plaster cast of the nose to be corrected is made and by carving the corrections on one-half of this and using it as a model at operation, greater certainty and precision are gained in the correction. A standard procedure in nasoplasty is detailed, with diagrams, and variations in this procedure are outlined to deal with unusual conditions; for example, retrusion of the mid-part of the face; correction of nasal deformities associated with hare lip is also discussed in detail.

The postoperative result is inferior when the tip of the nose is fleshy and thick. Postoperative splinting is

most important. It should attempt to do everything that was accomplished at operation and should be continued, usually, for twelve days.

L. T. BARCLAY

Obstetrics and Gynaecology

The Xenopus Pregnancy Test. Milton, R. F.: *Brit. M. J.*, 2: 328, 1946.

The advantages of the test include its simplicity, the objectivity, the rapidity with which a result may be obtained (6 to 18 hours) and the ability to use the toads again after a resting period of about three months.

As normally carried out the test is not sensitive enough to indicate pregnancies where gonadotrophic excretion is low, as is often the case in the early stages. The amount of urine which may be safely injected into the animal is quite small. A method of separation and concentration is described which provides a means of indicating the quantitative as well as the qualitative excretion of the hormone. Using this technique, a positive result may be obtained if the excretion of hormone is greater than about 500 I.U. a day—a condition which very rarely occurs in the absence of pregnancy, and usually is manifest after the first two weeks of pregnancy.

ROSS MITCHELL

Prolapse of the Umbilical Cord. Gusberg, S. B.: *Am. J. Obst. & Gyn.*, 52: 826, 1946.

As in other serious disorders where treatment is difficult, early recognition is most important. The author advises (a) prompt pelvic examination when the fetal heart indicates distress; (b) scrupulous attention to the time of rupture of membranes in breech and transverse presentations and multiple pregnancies with immediate pelvic examination unless contraindicated. Successful outcome is to be anticipated with full cervical dilatation by the use of the appropriate obstetric operation: forceps delivery, breech extraction, or version and extraction, carried out promptly but without undue haste. It is wise to allow fetal recovery from anoxia (after elevation of presenting part) before attempting delivery.

Improvement in results with incomplete cervical dilatation might be obtained by pursuing the following policy: (a) with recognition of a prolapsed cord, the patient should be transferred to a delivery room table, placed in combination lithotomy Trendelenburg position, anesthetized with oxygen-ether by a trained anesthetist and examined under sterile conditions; (b) the examiner should lift the presenting part out of the inlet in an effort to relieve pressure on the cord; (c) if the fetal heart returns to normal and if the patient is primiparous, or the cervix less than 3 F dilated, the patient should be subjected to Cæsarean section. While preparations for operation and induction of full anesthesia are completed, the examiner should continue to hold the presenting part out of the pelvis; the fetal heart should be checked repeatedly; (d) if the patient is multiparous and the cervix is 3 or more fingers dilated, it may be possible to secure safe operative dilatation by the use of the dilating bag. This, of course, calls for prior replacement of the cord which will be possible only with lesser degrees of cord prolapse.

If the infant has already succumbed at the time of recognition of the cord prolapse or it has been so badly compromised that the fetal heart cannot be improved with oxygen and elevation, it is unprofitable to subject the mother to major obstetric operations.

ROSS MITCHELL

Treatment of Breast Abscesses with Penicillin. Florey, M. E., MacVine, J. S. and Bigby, M. A. M.: *Brit. M. J.*, 2: 845, 1946.

In 1943-44 two simultaneous series of 18 patients suffering from breast abscesses were treated, one with accepted methods of the time and the other with a combination of intramuscular and local penicillin. The average healing time in penicillin-treated cases was reduced to half that of controls. Suppuration was hastened rather than retarded but ceased more rapidly.

The use of stilbæstrol was not necessary, and the mothers were able to continue suckling throughout treatment. The number of operations was reduced from 22 to 4. The total number of days which treatment at the hospital required was reduced from 661 to 232.

The methods of treatment with penicillin are described in the text and depend on the preliminary use of intramuscular injections followed by local administration.

ROSS MITCHELL

Endometriosis. Fallon, J. F., Brosnan, J. T. and Moran, W. G.: *New England J. Med.*, 235: 669, 1946.

Endometriosis is a frequent, not a rare, disease. A test period at the Fallon Clinic proved that it occurred with greater frequency among women than did acute appendicitis. Contrary to general opinion endometriosis possesses a basic syndrome which makes diagnosis possible. This syndrome consists of cumulatively increasing dysmenorrhœa occurring after about five years of menstruation without pregnancy. It is an antivenereal disease, being associated with sexual unfulfillment. The prophylaxis appears to be early marriage and a child every few years.

Endometriosis is a new growth of menstruating endometrium which tends to spread throughout the pelvis causing chemical peritonitis, dense adhesions, sterility, destruction of ovaries and intestinal stricture. Ovarian hormone is necessary to the progress of the disease. Ovarian deactivation will arrest progress but, if castration is to be avoided, diagnosis must be made early before the lesions have become mechanically unresectable.

The diagnosis of endometriosis should be made on the history alone even before endometriotic nodules can be felt in the pelvis. Early surgical exploration with thorough removal of the lesions may afford long relief and sometimes results in pregnancy.

Of the 200 cases forming the basis of this study 52 of the first hundred, and 45 of the second, required castration. Irradiation has a place in therapy but the disease may bind intestines into a dangerously immobile target for the x-rays.

NORMAN S. SKINNER

Dermatology

Contact Dermatitis from Penicillin. The Source of the Antigen. Friedlander, S., Watrous, R. M. and Feinberg, S. M.: *Arch. Dermat. & Syph.*, 54: 517, 1946.

Three principal types of reaction to penicillin have been reported; most common is urticaria. A vesicular or bullous eruption appearing shortly after inception of treatment is believed to be related in some way to previous fungous infection of the skin. Contact dermatitis has been chiefly observed in workers with the drug. Of 5 such cases 4 were studied and 3 found to be sensitive to the active principle of penicillin. Penicillin contains little if any of the antigen residing in penicillium fungus. The period of contact was relatively long (9 to 18 months) before sensitization appeared. In view of this and the small number of cases encountered in clinical practice it is concluded that penicillin may not be a very strong allergen. Nevertheless it must be remembered that penicillin is capable of producing a contact dermatitis and in local therapy many instances will arise in which prolonged contact with it may be desirable or necessary.

D. E. H. CLEVELAND

Death Following Exposure to D.D.T. Hill, W. R. and Damiani, C. R.: *New England J. Med.*, 235: 897, 1946.

The toxic effects of D.D.T. in warm-blooded animals are exerted principally on the central nervous system and the liver. With reasonable care and under ordinary conditions preparations containing D.D.T. do not present dangerous toxic hazards to human beings. Under special conditions involving an oily skin surface, large areas exposed, high temperature and rela-

tive humidity toxic effects in men have been produced. These include increased erythrocyte destruction, increase in reticulocytes, diminution of polymorphonuclears, with the appearance of immature white cells and presence of indoxyl sulfate in the urine. The symptomatology included tiredness, heaviness and aching of the limbs, diminution of reflexes, slight impairment of hearing and anxiety state. Similar results occurred in a laboratory worker who mixed 24 gm. in acetone solution with an inert powder and kneaded the mixture with bare hands.

In the fatal case reported an electrician was exposed while working in a room recently sprayed with 6% solution of D.D.T. in kerosene. He had inhaled fumes at close quarters and was sweating. An extensive pruritic skin eruption appeared the following day on trunk and extremities with an unproductive cough and dyspnea. This persisted for a week or more when he took to bed on account of increasing weakness and weight loss. The rash became ecchymotic and there was mental agitation and apprehension. There was hæmaturia, a leukocytosis of 43,000 with 20% eosinophils and 1% lymphocytes. The sedimentation rate was normal. With rapid deterioration of his condition and rising temperature there was no remarkable change in the blood findings. Clinical and roentgenological findings were consistent with a diagnosis of periarteritis nodosa. The liver became much enlarged and tender and the cephalin-flocculation test was 4-plus. Erosions of the pharyngeal walls and dysphagia appeared terminally. Autopsy findings taken in conjunction with history and clinical course led to the conclusion that this case was an exhibition of true allergy to D.D.T. and death was attributable to sensitization to this drug. The classical clinical picture shown of periarteritis nodosa, which has been observed in sensitization to iodides and sulfonamides, places D.D.T. among the drugs which may produce such a reaction simulating periarteritis nodosa.

D. E. H. CLEVELAND

Anæsthesia

Impending Death Under Anæsthesia. Bailey, H.: *The Lancet*, pp. 5 to 9, January 4, 1947.

The expectation of death under an anæsthetic is 1 per 1,000 when calculated on a very large number of cases from five teaching hospitals on three continents. The average emergency surgeon must be prepared to expect a mortality in excess of this unless a very definite plan of procedure for prevention and treatment of anæsthetic and operative complications is adopted. This article points out the valuable assistance that may be secured from early cardiac massage following upon sudden stopping of the pulse. Too frequently the chance to resuscitate a failing heart is lost irrevocably because of hesitancy to undertake this life saving procedure. He distinguishes between the heart stopping during "white asphyxia" and "blue asphyxia". The former may be considered primary cardiac failure and the latter secondary. The time element is important in both but less margin is available in primary cardiac failure. In the case of failure during "blue asphyxia" the cerebral mechanism is not deprived of blood—indeed it is congested and the cerebral cells therefore survive much longer.

As a procedure, he recommends pricking the ventricle with a needle within three-quarters of a minute of ascertaining that the heart has ceased to beat, and in the likely event of this simple procedure being ineffective, forthwith to massage the heart through a mid-line incision extending down from the xiphisternum, the heart being palpated through the diaphragm and compressed against the thoracic wall. Needless to say throughout all the procedure the anæsthetist should not allow any interruption of the administration of pure oxygen by mask in order to revive the heart, should it recommence to beat, with a flow of richly oxygenated blood. In some instances, almost as soon as the heart starts to beat, the patient breathes spontaneously. In others

artificial respiration must be carried out, sometimes for a long period. The all important fact to be remembered is that once cardiac failure has occurred, not more than 1½ minutes should be permitted to pass by before massage of the heart has been instituted. This of course is most easily done when it occurs during the course of an abdominal operation, and it is to be expected, as it has been amply demonstrated, that recovery in these cases is much more frequent and free from cerebral complications that in other operations which incur a delay.

F. ARTHUR H. WILKINSON

Neurology

Occlusion of the Basilar Artery—a Clinical and Pathological Study. Kubik, C. S. and Adams, R. D.: *Brain*, 69: 73, 1946.

This report was based on a study of 18 cases. The cases are reviewed with good illustrative diagrams. The blood supply of the pons and mid-brain as determined by experimental injection is described. The pons is supplied by the basilar artery and the mid-brain by the basilar and posterior cerebral arteries. There are three groups of branches of the basilar artery, the paramedian branches entering the pons just lateral to the mid-line, the short circumferential branches entering the pons about one centimetre lateral to the mid-line and the long circumferential arteries, being the superior cerebellar and the inferior cerebellar.

The clinical features of thrombosis and embolism differed only in minor details. The onset was sudden and not preceded by tangible causal factors. The first symptom was usually headache, dizziness, confusion or coma. Difficulty in speaking and unilateral paresthesias occurred in a large portion of cases. Common findings were pupillary abnormalities, disorder of ocular movements, facial palsy, hemiplegia, and or quadriplegia, and bilateral extensor plantar reflexes. Cranial nerve palsies contralateral hemiplegia might be combined. Not all of these signs were present in every case. It was common for there to be a temporary improvement. Death took place in the majority of cases in from two days to five weeks. A few cases survived. The cerebrospinal fluid was normal.

As well as the 18 autopsy cases there were 7 patients who were still living after 2 to 14 months. Four of these are described.

PRESTON ROBB

Human Toxoplasmosis. Callahan, W. P. Jr., Russell, W. O. and Smith, M. G.: *Medicine*, 25: 343, 1946.

Toxoplasmosis is generally regarded as a protozoan parasite, although its exact classification is not definitely determined. It has been shown that the incidence of the disease is much greater than has been generally recognized. The occurrence of toxoplasmic infection in lower animals suggests that they may serve as a reservoir of the disease and that it may be transmitted to man by some intermediate anthropod vector or by direct contact. In the infantile type the extensive destruction of the nervous system that is seen at birth is irrefutable evidence that the infection was present and progressive before birth. The method of infection of the fetus is not clear. The age of onset of the childhood type is more difficult to ascertain. It is felt that the adult type is an acquired infection and may occur at any age.

In the infantile type the severe cellular reaction seen in the leptomeninges is dependent on the amount of damage to underlying brain tissue. The pathological changes within the gray matter of the cerebral cortex vary from small foci of cellular infiltration to large zones of necrosis with extensive destruction of brain substance. In many of the necrotic foci cysts form that become infiltrated with plasma cells and lymphocytes. One of the consistent findings in the infantile type is the presence of large foci of calcification within the zones of necrosis. Small granulomatous lesions are found scattered throughout the basal ganglia. Periventricular infiltration with plasma

cells and lymphocytes with ulceration of the ependymal lining is frequently observed. Ulcerative lesions and glial nodules may occlude the aqueduct and account for the hydrocephalus that is almost always present. The pons is usually the site of advanced pathological lesions. The medulla was involved in all their cases. The degree of change in the cord was variable from small lesions to areas of extensive myelomalacia. The choroid and retina were common sites of lesions.

In adults and older children, the disease manifests itself more in the other viscera with minimal lesions of the central nervous system. Neurological signs and symptoms in infantile toxoplasmosis include internal hydrocephalus, muscular twitching, convulsions, spasticity, opisthotonus, retraction of the head, stiff neck and paralysis. Chorioretinal atrophy is almost always found. Other generalized signs are seen including jaundice, respiratory disturbances, temperature, gastrointestinal symptoms, and cardiovascular symptoms. Cerebral calcification may be seen in cerebral hemisphere, basal ganglia, and thalamus by x-ray examination. No satisfactory treatment is known.

PRESTON ROBB

Addiction to Meperidine Hydrochloride (Demerol Hydrochloride). Wieder, H.: *J. Am. M. Ass.*, 132: 1066, 1946.

The addiction to the opiate drugs embraces three related phenomena: first, tolerance or gradual decrease in the effect produced by repeated administration of a drug; second, physical dependence which is manifest by the appearance of a characteristic illness if the drug is withheld, and third, habituation, an intense desire for the repetition of pleasurable effects associated with the use of a drug.

Demerol should be regarded as an addicting drug in the same class as the opiates, as all three of the above phenomena have been observed. Three cases are reported in which the patients were taking extremely large doses of the drug. Reference is made to other reports where similar cases are recorded. The author feels that the same precautions should be used with this drug as with the opiates.

PRESTON ROBB

Curare and Intensive Physical Therapy in the Treatment of Acute Anterior Poliomyelitis. Ransohoff, N. S.: *Bull. New York Acad. Med.*, 23: 51, 1947.

The author briefly describes the method of treatment with combined physiotherapy and curare that was used on 29 patients during 1945. Insufficient evidence is given to adequately compare the method with the more standard procedures now used. However the method seems promising and is worthy of further study and trial.

The dosage of curare (Intocostin, Squibb) recommended was 0.9 units per kilogram of body weight every eight hours for the first twenty-four hours. It was then increased to 1.5 units per kilogram of body weight if there had been no adverse reaction. The physical and occupational therapy procedures used were based on the objective of re-establishing and maintaining normal muscle lengths. Patients were made ambulatory as soon as possible, thus preventing the loss of the kinesthetic sense of the upright position. It was freely admitted that the treatment could not have any possible effect on spinal cord disease.

Electromyographic studies showed resting action currents in the muscles to be diminished or obliterated by means of curare and intensive physical therapy in the form of stretching beyond the point of pain.

PRESTON ROBB

Morphologic Changes in the Brain of Monkeys Following Convulsions Electrically Induced. Ferraro, A., Roizin, L. and Helfand, M.: *J. Neuropath. & Exp. Neurol.*, 5: 285, 1946.

In this article a careful report is made on the study of ten monkeys. Electrical currents similar in type, intensity, duration of current flow and frequency with

that used in human electric shock therapy were shown to cause morphologic changes in the central nervous system of monkeys.

The nerve cell alterations were mostly of the reversible type. The changes were mostly related to circulatory disturbances and increased permeability of the blood vessel walls. The latter was shown by distension of the perivascular spaces and perivascular oedema and some diapedesis of formed blood elements.

When more intense currents of longer duration were applied, occasional minute petechial haemorrhages resulted. This supported the contention that the severity of the lesions was proportional to the intensity of the electrical current, the duration of flow, and to a lesser extent, to the number of electric shocks. The histologic changes were more pronounced in the areas of the tissue traversed by the main path of the current.

They feel that reversible chemical and structural changes and possibly some slight permanent structural damage may be at the base of the temporary alterations in the mental processes occurring in patients in the course of electrical shock therapy.

In cases where structural damage does not occur, it is conceivable that some physio-chemical change may take place in the brain structure of the animals though they may not be histologically detectable with the available techniques. In such cases histometabolic studies of brain tissue may be indicated.

PRESTON SOBB

Industrial Medicine

Introducing the Five-Day Week. Bower, W. H.: *Indust. Welfare*, 28: 162, 1946.

The contribution of the shorter working week to increased production and to decreased absenteeism, is indicated by this article in which the author presents the results achieved from the introduction of a five-day working week in a medium-sized firm.

The company under observation has one plant in South London employing about 450 operators and two smaller ones with 100 and 120 workers each. Some 80% of the workers are women. The products manufactured are such instruments as syringes and hypodermic needles, the work involved is monotonous. In 1943 after the five-day week was introduced, the hours were 47 a week instead of the 51½ previously worked. The tea breaks of 15 minutes during the morning and 10 minutes during the afternoon remained unchanged, but the one hour shopping time formerly allowed each week for women employees with domestic responsibilities, was eliminated. In one of the smaller factories where careful output figures were kept for each operator, it was found that within the first fortnight production increased in every case more than 10% and in some cases by as much as 25%. Production in the main factory increased by some 12% and has remained fairly steady at this level. Absenteeism also showed marked improvement, dropping under the five-day week to between 7 and 8% from its former average of 9 to 10%. Although it rose slightly with the end of the war, largely due to general fatigue after intensive war efforts and to possible uncertainty regarding domestic position, during recent months, the situation has again improved.

Wage adjustments have been necessary in order to maintain the same basic wage as before the reduction of working hours. The management have now decided to reduce the hours still further to 45 per week and anticipate that even further reduction will be possible in the future.

MARGARET H. WILTON

Some Aspects in the Occupational Adjustment of the Blind. Farmer, E.: *Occup. Psychol.*, 20: 158, 1946.

In the opinion of the author, the main consideration in the vocational guidance of the blind is to adjust them to the sighted world so that they may feel truly at ease and not be constantly reminded of the handicap of blindness. Generally speaking, they should be guided into occupations that are well within their mental capacity, and that are likely to produce generous remuneration. Avoidance of undue strain is

essential. The occupation selected for a blind person should be one which he can do well, thus making him feel a contributing member of society.

There are many simple occupations suitable for those persons in the lower levels of mental ability. The few who have exceptionally high mental ability can undertake administrative work at a high level, and can fill positions which automatically carry the assistance of a secretary. It is those falling in the middle ranges of mental ability who present a vocational adviser with his most difficult problems. They are not capable of filling the higher posts. If they attempt something beyond their capacity, great strain will result, and yet, the simpler easy-to-learn occupations would not satisfy their mental life. Special attention should be devoted to leisure pursuits; for those persons with mental ability above the average, non-vocational education is important. If their minds are insufficiently furnished to deal with their leisure time, boredom will result.

The author feels that much more could be done than at present to help in the social adjustment of the blind and advocates a sound vocational policy as a real way of contributing towards it.

MARGARET H. WILTON

OBITUARIES

Le Dr T. Archambault est décédé le 9 janvier à l'âge de 88 ans. Il avait fait ses études classiques au collège de l'Assomption, puis avait suivi ses cours de médecine à l'école Victoria. Il s'établissait ensuite à St-Paul-l'Ermite, où il a pratiqué sa profession toute sa vie. Il s'était imposé comme le type parfait du médecin de campagne, et sa réputation s'étendit bien au delà de sa place natale.

Une fils et une fille lui survivent.

Dr. Richard Martin Bateman died February 1 at his home in Toronto, in his 86th year.

Born at Oakwood, Dr. Bateman at an early age moved to Scugog Island, where he later taught in the school-house located on his father's farm, opposite Port Perry. After graduation from Eastman National Business College, Poughkeepsie, N.Y., he returned to Canada and entered Victoria College, Cobourg. In 1886 he graduated from Victoria College and received his license from the Ontario College of Physicians and Surgeons. Dr. Bateman spent some months in Great Britain in post-graduate study. In 1887 he established a practice in Pickering, where he remained until 1907, when he came to Toronto. For more than 30 years he practised in East Toronto, retiring 12 years ago.

An expert as a numismatist, Dr. Bateman had made a valuable collection of coins and specialized in Canadian tokens. He was a past master of Doric Lodge, A.F. & A.M., Pickering, and a charter member of Riverdale Lodge.

Surviving are his widow and three daughters.

Dr Léon Côté, est décédé à l'âge de 78 ans à Cabano, N.B., le 31 décembre 1946.

Il était le premier médecin résidant dans ce village depuis au delà de 40 ans et il a toujours professé jusqu'à ces dernières années.

Deux filles et un fils lui survivent.

Le Dr Benoit Dumais mourut subitement le 10 décembre, à Ste-Anne-de-la-Pocatière.

Originaire de Ste-Denis-de-la-Bouteillerie, il est arrivé à Ste-Anne-de-la-Pocatière en 1908. Il poursuivit ses études classiques au collège où il obtint son baccalauréat des arts en 1915. Il poursuivit ses études médicales à l'université Laval, Québec, et obtint son doctorat (c.l.) en 1919.

Après avoir commencé sa pratique médicale à St-Clément de Témiscouata, il revenait à Ste-Anne en 1921 pour s'y établir définitivement. Dr Dumais s'est surtout distingué au cours de sa carrière par sa probité professionnelle. Quantité de gens ont su profiter de ses grandes connaissances médicales continuellement rafraîchies et tenues à la page; aussi laisse-t-il aux paroissiens de Ste-Anne et de la région le souvenir de ses succès, de sa conduite exemplaire, de bon chrétien et de son zèle assidu pour ses malades, et l'on peut dire comme Bossuet: "Son éloge se trouve dans le regret de ses amis".

M. le Dr Dumais laisse dans le deuil, en plus de son épouse, deux fils et une fille.

Dr. J. H. Duncan, formerly of Manyberries and Lethbridge, died suddenly in Saskatoon January 2, in his 75th year. A citizen of United States, Dr. Duncan came to Southern Alberta from North Dakota about 1910, settling in the Altorado district, south of Etzikom. For a number of years he practised medicine in Manyberries operating a drug store in connection with his practice.

He was active politically, having run as Independent candidate for Cypress constituency for the Alberta legislature. Some years ago he came to Lethbridge to live, later moving to Saskatoon.

Le Dr F.-A. Fleury, directeur général de l'hôpital St-Luc et de l'hôpital Pasteur, est décédé subitement le 5 janvier, à Outremont, à l'âge de 72 ans.

Il avait été le fondateur de ces deux institutions et en était toujours demeuré l'âme dirigeante.

Né à Katevale de Hatley, près de Sherbrooke, le 8 mai 1874, il avait fait ses études à Sherbrooke et au séminaire de St-Hyacinthe pour recevoir avec distinction ses diplômes de médecin à l'université Laval de Montréal en mai 1900. Il fut interne en chef à l'hôpital Notre-Dame jusqu'en 1905 après quoi il alla se spécialiser à Paris. De retour à Montréal il dévoua sa vie à l'œuvre de l'hôpital St-Luc et Pasteur auxquels son nom restera toujours attaché.

Ténor très distingué, il fut pendant de nombreuses années membre des chorales du Gesù et de St-Louis-de-France.

La femme ainsi qu'une fille et trois fils lui survivent.

Dr. Archibald Leslie Foster, died in Ottawa on January 12.

Dr. Foster, who was 80 years of age, had practised in Ottawa for more than half a century and at the time of his death was an honorary consultant on the Ottawa Civic Hospital Board.

Dr. David Henry Gesner, of Grimsby, Ont., died on January 21, in his 78th year. Born in Kent county, he had resided at Grimsby for the last 42 years.

Surviving, besides his widow, are four sisters.

Dr. James Frederick Grant, aged 59, for many years a resident of Victoria, died January 9, in the Royal Columbia Hospital, New Westminster. He was born in Wellington, Vancouver Island.

He is survived by two sons, two daughters, five brothers and three sisters.

Dr. William Hale, president of the Medical Society of the State of New York and a former resident of Gananoque, died January 16.

Dr. Hale took office as president of the medical society last May. He was born at Gananoque in 1886 and attended Amherst College and Queen's Medical College, from which he graduated in 1910.

Dr. Hale took up residence at Utica, N.Y., 35 years ago and interned in Faxon Hospital and the Utica State Hospital, and did postgraduate work in Manhattan State and Bellevue hospitals, New York. He opened his practice in Utica in 1914 and was commissioned in the British Army in 1915, and was with the 42nd Battalion of the Black Watch, Royal Highland Regiment of

Canada. After the battle of Vimy Ridge he was invested by King George V at Buckingham Palace with the Military Cross. A year later he again was decorated for exceptional service.

He is survived by his widow, one son and one daughter.

Dr. Tilson L. Harrison, whose thirst for adventure in the world's trouble spots for half a century led him into wars and uprisings on five continents died January 10 on a mercy mission to one of China's Communist-held sections, according to word received from Shanghai.

UNRRA officials, who announced his death, gave his age as 58, but Ontario records indicate that he was born in Tillsonburg on January 7, 1881—or 66 years ago. At the age of 14 he left home to join the 22nd Oxford Rifles of Ontario.

Later Dr. Harrison saw service in the Philippines with a United States engineering corps during the Spanish-American War. Then he studied at the University of Toronto, took a medical degree in 1907 and headed for Mexico, where he served with Pancho Villa, Mexican rebel leader.

His wanderings led him to China, where he took part in an attempted revolution, to Mexico again and then back to Canada. At the outbreak of the First Great War Dr. Harrison received a commission and went overseas in 1917 with the Royal Canadian Army Medical Corps.

He is survived by his mother and a daughter.

Le Dr C.-E. Hayes, 74 ans, chirurgien bien connu est mort à Cowansville le 14 janvier, à la suite d'une attaque d'angine. Il laisse son épouse et deux sœurs.

Dr. George H. Jackson died in December, 1946, at his home in Port Stanley, Ont., where he practised for twenty-six years. Located at Union for many years before he moved to Port Stanley Dr. Jackson's name became a household word in many homes throughout the district. In one sense he could be called an old-time doctor—the country type, if one cares to use that term in its broader meaning. Yet he kept up-to-date with modern methods and in technique, even when failing health and advancing years forced him to relinquish much of what had always been an extensive practice. Also, particularly during the years he lived at Port Stanley, he gave leadership in community affairs, his work on the village council, for several terms as reeve and as representative for the County Council, being outstanding. His was a well-rounded life, the influence of which will continue to be felt throughout the community he served so well.

Dr Louis-Napoléon Lamothe est décédé récemment à l'âge de 46 ans. Il avait fait ses études au collège Ste-Marie et à l'Université de Montréal. Il était attaché à l'hôpital Ste-Justine depuis 14 ans.

Il laisse outre son épouse, un fils, et deux filles.

Dr. Norman V. Leslie, aged 65, died on January 9 in Hamilton, Ontario. He graduated in medicine from the University of Toronto in 1908.

Dr. Isabel McConville, aged 86, an early graduate of Queen's Medical College for Women, died January 3, in Kingston, Ontario. Graduating in 1889, she practised medicine here for 57 years and was long active in Roman Catholic affairs. She was physician to the Sisters of Notre Dame Convent and Hotel Dieu Hospital.

Dr. James Orville Macdonald died on January 13 at Savannah, Ga., where he was spending a holiday. He was a member of the staff of Columbia University, New York, City.

Born at Strathroy, Dr. Macdonald was a graduate of Queen's University in both medicine and mining engineering. He engaged in mining engineering in Northern Ontario for a short time. After the First Great War he practised medicine in Kingston for a time

before taking a postgraduate course in eye, ear, nose and throat at Columbia University, where he later became a member of the staff.

A veteran of both wars, Dr. Macdonald served overseas in the First Great War with the R.C.M.C., and in the Second saw service with the United States Navy Fleet Air Arm, holding the rank of lieutenant-surgeon commander.

Surviving are four sisters.

Dr. Edward George Mason, O.B.E., died in hospital January 3 after a brief illness. He was 72 years old.

He was born in Hamilton, Ontario, and attended Bishop's College in Lennoxville, Quebec, and McGill University where he graduated in 1902. He came to Calgary to practise that year. He was instrumental in the founding of the original Calgary Tigers football club in this city, having played the game while at school and also for the Hamilton Tigers.

Dr. Mason was senior major of the 31st Battalion when the First Great War broke out and was given the job of recruiting the 50th Battalion. He served as commanding officer, with the rank of Lieut.-Col. and took the unit overseas. He was wounded in France and after his discharge from hospital he was transferred to the Royal Canadian Army Medical Corps as there was a shortage of medical officers at that time.

He was placed in command of the Shorncliffe medical hospital in England and remained in command there until June 1919 when he returned to Canada.

He worked with the Department of Pensions and Health, now the Department of Veterans' Affairs, and was neuro-psychiatrist for the local offices at the time of his death. He was a charter member of the Eugenics Board of the Province of Alberta. In 1946 he was made a life member of the College of Physicians and Surgeons, and also a Fellow of the Royal College of Surgeons.

In 1928 he was made doctor of psychiatric medicine by the University of Alberta. He was also a member of the American and Canadian Philatelic societies, past president of the Calgary Stamp Club, and a member of the Calgary Gun Club, Victoria Curling Club, the Calgary Golf and Country Club, the Glencoe Club and the Calgary Medical Association. He was awarded the jubilee medal at the time of the Coronation.

He is survived by his widow, two daughters and a son.

Dr. William Wesley Lorne Musgrove died suddenly at his home in Winnipeg on January 4. Born in Winnipeg January 15, 1882, he moved at an early age to Stonewall. He was educated in the Stonewall schools and Wesley College before entering Manitoba College where he graduated with honours and as a medallist in 1906. After spending a year as house surgeon in the Winnipeg General Hospital, he began practice in Winnipeg. On the outbreak of the First World War he enlisted in the C.A.M.C. and went overseas in 1916 as a major with No. 4 Casualty Clearing Station, a unit raised by Manitoba Medical College. On being invalided home he served as president of the Medical review board for Military District 10.

In 1920 he was made a Fellow of the American College of Surgeons. In 1932 he was president of Manitoba Medical Alumni Association, and in 1934-35 he was president of Winnipeg Medical Society. In 1946 the Society conferred on him honorary life membership. From 1919 to 1945 he lectured in surgery and clinical surgery in the Faculty of Medicine, University of Manitoba, and served for a time as honorary surgeon in the out-patient department of the Winnipeg General Hospital.

Dr. Musgrove was a fine athlete. He was a member of the Shamrock Football Club which won the Manitoba Championship in 1901 and then toured eastern Canada. He was active in intercollegiate sport and after graduation turned to curling and golf, being a charter member of the Niakwa Country Club.

He was an active member of Young United Church, serving on the board of stewards and the music committee, and was prominent in the Kiwanis club.

Surviving are his widow, and three sons, all of whom served in the Second World War, and two of whom are doctors, Col. G. Stuart Musgrove, R.A.M.C. and Dr. J. Edward of the Mayo Clinic, Rochester.

He died as he would have wished—in harness. On the morning of his death he visited the Medical Arts Building and in driving away greeted the writer with a smile and a wave of the hand. Ave atque vale!

ROSS MITCHELL

Dr. Elzear Paquin, 96-year-old veteran of the Canadian medical profession and prominent author and editor, died January 15.

Dr. Paquin was born at Ile Bizard in 1850. He studied at the Ste Therese of Blainville seminary and at Laval (now Montreal) University. After his admission to the profession he moved to Chicago, where he practised for a number of years. While there he took a prominent part in the fight for teaching French in Chicago schools. In order to help the cause, Dr. Paquin founded and edited a weekly, *Le Combat*, in which he carried on the battle for French with vigour.

He later returned to Montreal, where he resumed his practice. A fiery propagandist of the nationalist cause, he wrote for a number of publications, including the then noted *Nationalist* weekly.

Dr. Paquin also became prominent as a writer on philosophical subjects. He took part in the defence of Louis Riel, leader of the Northwest Rebellion, when the latter was arrested and tried at Regina. As his contribution to that cause he wrote a book, "Riel," in which he condemned the execution of the rebel leader as a national and judicial crime.

As a philosophical writer, he was the author of "La Cité du Bien et du Mal" and "La Longévité de la Vie Humaine".

Dr. Paquin is survived by two sons.

Le Dr Salluste Roy est décédé à Québec le 31 décembre à l'âge de 87 ans.

Né à St-Jean-Port-Joli, comté de L'Islet, en 1859, il obtint son doctorat en médecine en 1883, exerça sa profession avec son père, à St-Jean, durant deux années, et entra en 1885 dans le service médical de l'asile de Beauport (aujourd'hui l'hôpital St-Michel-Archange), qu'il ne quitta jamais. En 1923, il fut nommé surintendant, succédant au Dr M. Delphis Bronchu.

Il laisse: trois fils, et cinq filles.

Dr. John Albertson Sampson, gynaecologist and investigator, died on December 23 in the Albany Hospital at the age of 73.

Dr. Sampson was born in Brunswick in Rensselaer County in New York State. He was graduated from Williams College in 1895 and from the Medical School of the new John Hopkins in 1899. It seems that those who were so favoured in those early days as to come under the spell of Welch and Osler were deeply inoculated with a spirit of inquiry. Even more characteristic, perhaps, was the indoctrination with the gospel of work. John Sampson was no exemption. In 1905 he began the practice of gynaecology in Albany and the amount of work which he crowded into a day was said to have been prodigious. How he found time for his original work is hard to comprehend.

Dr. John Sampson will be mourned by all those who were familiar with his monumental works and more particularly by those who knew him as a scientific, tireless, honest, and unassuming man. Through his life, medical knowledge has been enriched; through his passing, the medical world has suffered an irreparable loss.

Dr. Frederick H. Scherk died suddenly at his home in Hensall, Ontario, on January 14. He graduated in medicine from the University of Toronto in 1890.

He is survived by his widow.

Dr. Bessie Thelma Singer (née Pullan) died at Forest Hill, on January 4.

She graduated in medicine from the University of Toronto in 1909.

Surviving are her widower and two sons.

Dr. Edward Lovell Stoll, medical practitioner in Toronto for 23 years, died January 13 at St. Michael's Hospital. He was 52 years old.

Born in Niagara Falls, Ontario, Dr. Stoll received his early education there. In 1919, he graduated in medicine from the University of Toronto and interned in St. Michael's Hospital, before taking up private practice.

Surviving are his widow and two brothers.

Dr. Edward Vincent Sullivan died in Saint Joseph's Hospital, January 24, 1947 after a short illness. For many years Dr. Sullivan was prominent in St. Stephen as a physician and good citizen. He served in the first Great War in the C.A.M.C. and was wounded on service. He was deeply interested in the Canadian Legion and in preventive medicine. He was for many years a member of the school board at St. Stephen. He was a graduate of Tufts Medical College. Since 1942 he was in charge of the medical service at the Provincial Hospital of Fairville, N.B.

A. S. KIRKLAND

Le Dr Charles-Edouard Turcot est décédé le 8 janvier à l'âge de 67 ans, après une courte maladie.

Après des études exceptionnellement brillantes au Petit Séminaire et à l'Université Laval, le jeune praticien s'était d'abord établi à St-Malo d'Auckland, dans les Cantons de l'Est. Plus tard, il fit un long séjour à Paris où il étudia sous les plus grands maîtres de son art. Il pratiqua ensuite à Pincher Creek et devint, après quelques années, l'associé professionnel du sénateur Blais, à Edmonton, Alberta. Il retourna une seconde fois en Europe pour se spécialiser dans la pédiatrie et vint définitivement s'établir à Québec, où sa science et son dévouement inlassable lui valurent en peu de temps une large clientèle. Créateur et médecin en chef du service de pédiatrie à l'hôpital de l'Enfant-Jésus, directeur de l'Œuvre de la Goutte de lait pour le quartier St-Roch et la Haute-Ville, le docteur Turcot était reconnu comme une autorité et devint la providence des enfants pauvres et des déshérités. En reconnaissance de sa haute valeur, l'Académie américaine de Pédiatrie l'avait admis au nombre de ses membres les plus distingués et nombre de sociétés médicales s'honoraient de sa présence et de sa collaboration.

Cinq frères et cinq sœurs lui survivent.

Dr. Wesley Whitefield Tyerman, aged 64, pioneer practitioner in the Milestone, Saskatchewan district, died suddenly at his home in Regina January 13. A native of Grey County, Ontario, Dr. Tyerman graduated from the University of Toronto in 1909 and came to Milestone that year.

He is survived by his widow, a son and a daughter.

Adding a little ascorbic acid, or vitamin C, powder to the syrup in which peaches are packed for freezing will prevent unsightly discoloration, reports the New York State Agriculture Experiment Station. One gram of the ascorbic acid powder, which also increases the nutritive value of the peaches, is sufficient to prevent five pints of sliced fruit from browning.

NEWS ITEMS

Alberta

A series of weekly seminars are being held at the Colonel Belcher Hospital, Calgary. Papers are presented by outstanding medical and surgical men of the Province. To date these have proved very popular and a very keen discussion follows the presentation of papers.

At the annual meeting of the Council of the College of Physicians and Surgeons of Alberta held in Edmonton on January 30, Dr. M. A. R. Young, of Lamont, was elected President. Dr. T. C. Michie, of Ponoka, was elected Vice-president. Other members of the Council for 1947 are: Dr. W. G. Anderson, of Wardlow; Dr. S. M. Rose, of Lethbridge; Dr. J. W. Richardson, of Calgary; Dr. J. D. Neville, of Camrose; Dr. T. H. Field, of Edmonton.

The meeting of the District No. 7 Medical Society was held in Wetaskiwin on January 10, 1947. Twenty-two doctors were in attendance. Following the business part of the meeting, Dr. B. K. Thomson, of Edmonton, discussed the medical aspects of gall-bladder disease and Dr. W. C. MacKenzie, of Edmonton, discussed the surgical aspects of this disease.

G. E. LEARMONTH

British Columbia

The Grimmett report on companies and associations selling various plans of health insurance was made public recently. In this report a great many companies were dealt with. Many of them were shown to be operating on a basis which did not give adequate service to the insured. Some were quite good, but in the opinion of the author, the most satisfactory service was given by such organizations as the Medical Services Association of British Columbia, the B.C. Telephone and B.C. Electric plans, the Civil Service Association, and one or two others of similar character. These various plans, as it happens, have all been accepted by the British Columbia Medical Association.

The resignation of Dr. A. K. Haywood as General Medical Superintendent of the Vancouver General Hospital is a matter of great regret to all those who for the past twenty years or so, have been associated with the Vancouver General Hospital under his control. Dr. Haywood has been for long one of the outstanding Medical Superintendents of Canada, and his loyalty and devotion to this great hospital have done much to bring it to its present high status of efficiency. He will be greatly missed.

The Vancouver General Hospital has been the first to sign up for the use of the Red Cross Transfusion Service, and beginning February 10, 1947, will avail itself of this Service. Other hospitals will undoubtedly follow. This will be a great advance in hospital practice.

Another general rise in hospital fees has been authorized by most of the major hospitals of B.C. One thinks with regret of the old days, when a dollar a day gave a patient everything except his doctor's fees. But the increase, in view of modern hospital service, is, of course, quite inevitable.

Dr. J. A. C. Thomson, of the Staff of Christie Street Hospital, Toronto, has joined the Burris Clinic in Kamloops, following five years' service overseas and in Canada with the R.C.A.M.C.

Dr. Phillip Bailey has joined Dr. H. B. McGregor of Penticton in his practice in that City.

Dr. F. W. Tysoe, a new registrant in the Province, has commenced practice at Britannia Beach, B.C.

Dr. John Brown, formerly of Bralorne, is now practising in Vancouver.

Dr. G. E. Trueman, formerly of Tranquille, is now practising in Kamloops.

Dr. C. J. Treffry, formerly of Toronto, is now practising in association with Dr. Howard Spohn of Vancouver.

Dr. G. E. Little has commenced practice in Bralorne, British Columbia.

We regret to report the recent passing of Dr. J. F. Grant of Victoria.

Dr. John Caldwell has returned from Des Moines, Iowa, to practice in Vancouver. J. H. MACDERMOT

Manitoba

On the occasion of the 70th birthday of Dr. W. A. Gardner a number of his friends met at dinner in the Manitoba Club, Winnipeg, on January 31. Dr. J. A. Gunn was chairman and Dr. W. E. Campbell related the facts of Bill's life and dwelt on how he had all through retained his shining morning face. Mr. Justice Dysart, Chancellor of the University, presented Dr. Gardner with a desk set bearing the Manitoba buffalo and two fountain pens and proposed his health. Dr. Gardner replied in his inimitable fashion and related habitant stories from his native Quebec.

Dr. Wallace Grant has been appointed superintendent of the Children's Hospital, Winnipeg, in succession to the late Dr. G. S. Williams.

Manitoba Medical Service for the 12 months ending December 31, 1946, showed an operating gain of \$8,592.19, but this was on a basis of paying 65% on the claims of physicians and surgeons.

At the annual meeting of the honorary attending staff of the Winnipeg General Hospital on January 14, Dr. R. M. MacCharles was elected chairman, Dr. L. G. Bell, vice-chairman and Dr. A. R. Birt, secretary.

The American College of Surgeons will hold a regional meeting in the Fort Garry Hotel, Winnipeg, on April 14, 15.

At Brandon on January 31 the Associated Canadian Travellers presented a cheque for \$15,500 to the Manitoba Sanatorium Board for anti-tuberculosis work in the Province. This gift brings to \$33,000 the amount given the local branch A.C.T. to the work in the past two years.

Dr. John Farr, late R.A.M.C., and Dr. John Patmore Gemmell, late R.C.A.M.C., have recently joined the staff of the Winnipeg Clinic. ROSS MITCHELL

New Brunswick

Dr. Irene Allen (McPherson) of the Medical Staff of the Saint John Tuberculosis Hospital is now a Fellow of the American College of Physicians.

Dr. Milton F. Gregg, V.C., President of the University of New Brunswick, presided at the Annual Meeting of the N.B. Branch of the Canadian Cancer Society. Dr. Gregg was re-elected president for 1947-48. This young branch has done a remarkably fine job in its first year of life and the list of officers and committees elected at this meeting is proof of the widespread interest being taken by the whole province. Plans for

next year are proposed to arouse interest, further education of the general public, provide new local diagnostic clinics, provide social service workers and household aids in stricken families and provide for prompt treatment of cancer patients in out-lying districts by aiding financially in the problem of transportation. The Medical Advisory Committee of the Branch is as follows: Dr. J. R. Nugent, Saint John; Dr. J. A. Melanson, Fredericton; Dr. H. L. Ripley, Moncton; Dr. H. S. Everett, St. Stephen; and Dr. R. A. H. MacKeen, Rothesay. Dr. Milton Gregg and Dr. J. R. Nugent were elected Councilors of the Canadian Cancer Society and Dr. J. R. Nugent was nominated as a director of the National Body.

Dr. H. S. Wright, a veteran in municipal politics in the city of Fredericton was re-elected to the city council in the recent elections which were of increased interest due to the rapid growth of this, the capital city of New Brunswick.

Dr. A. L. Donovan of Saint John is convalescing after a major abdominal operation at the Lahey Clinic in Boston. Latest reports indicate satisfactory progress.

The Moncton Tuberculosis Hospital was to be opened on January 15, 1947, but the opening date was postponed due to acute water shortage in the Moncton district. The Superintendent is Dr. Perry M. Knox who has been for some years head of the River Glade Sanatorium. Dr. Knox brings to this new appointment the experience gained in a brilliant career in special work in the treatment of tuberculosis. This new institution, the fifth hospital in New Brunswick equipped especially for the treatment of tuberculosis was created out of the General Hospital which was built during war time for the R.A.F. and R.C.A.F. depots. It is expected that orthopaedic surgery of tuberculosis for the Province will be centralized here under the direction of Dr. E. W. Ewart of Moncton.

Dr. R. T. Hayes was the special speaker at the January Meeting of the Saint John Medical Society. His subject "Ophthalmic problems of general interest". He discussed retinopathy of hypertension, diabetes, renal disease etc. in terms of diagnosis and prognosis and showed a large group of slides of retinal conditions in colour photography. Discussion and question and answer brought out the active clinical interest in this extremely specialized field.

Dr. George F. Skinner of the Surgical Staff of the Saint John General Hospital was recently appointed to a position on the Board of Commissioners of the Hospital by the municipal council of the City and County of Saint John.

Dr. A. J. Losier of Chatham was presented a life membership in the Chatham Branch of the Canadian Legion at the monthly meeting in January. Dr. Losier has been active in the interests of veterans.

Dr. R. T. Hayes was elected President of the St. Patricks Society of Saint John at the January meeting. A. S. KIRKLAND

Nova Scotia

A metropolitan health commission caring for an area including the City of Halifax, and an extensive area beyond it was recommended some time ago by the Rockefeller Foundation. It has recently been considered again and Dr. Alan Morton, Commissioner of Health for the City of Halifax believes it would effect a saving of \$40,000 a year to the city. It is hoped that the Province will be able to assist the project financially.

Dr. Karl Garten, of Halifax, has accepted a position as radiologist at a hospital in Niagara Falls, New York.

Dr. Sidney Gilchrist accompanied by Mrs. Gilchrist and three of their children sailed recently for Cape Town, South Africa en route to Angola, Portuguese West Africa, where Dr. Gilchrist will resume his work as a medical missionary. They are faced with the prospect of making their way from the Cape to Angola across the Kalahari Desert in a jeep and a small motor truck. During the war, Dr. Gilchrist was a Major in the R.C.A.M.C., and saw service in Europe and North Africa. Following his discharge he took postgraduate work and secured his D.P.H.

The death recently of Donald A. Cameron, of Boston and Halifax, removed a man to whom the Canadian Medical Association owed a great debt. In 1921 when the affairs of the Association had reached its lowest ebb, it was Mr. Cameron who helped to collect the necessary money to put it on its feet again. He afterwards made a highly successful career for himself in life insurance, and was one of the Governors of Dalhousie University.

Dr. H. R. Roby, who since his discharge from the services has been practicing in Pugwash, has located permanently in Oxford.

The physicians of Glace Bay where a weekly check-off scheme is in effect, have notified their subscribers that they cannot continue to furnish drugs for the present check-off rate. As someone remarked, "the miners have a strike on their hands". The whole matter is at present under review, and will no doubt result in an improved arrangement.

In a recent local address Dr. C. M. Bethune, Superintendent of the Victoria General Hospital, Halifax, stated that the new hospital building would be open in the late autumn of 1947 if there was no halt in present plans. There will be accommodation for approximately 400 beds in the new unit.

The wind blows high in Nova Scotia, at least so says Dr. J. R. Cameron, of Middle Musquodoboit. A year or so ago when answering a call on a very stormy night, a tree fell across the road demolishing the front of his car. During the last big storm the force of the wind, coupled with a slippery road, carried the car off a bridge. In both instances Dr. Cameron was unhurt, but the car damage has no doubt caused serious inconvenience.

H. L. SCAMMELL

Ontario

The Medical Alumni of the University of Toronto will hold a luncheon meeting on May 15 at the time of the Ontario Medical Association Annual Meeting. The question of becoming an incorporated non-profit organization will be discussed.

Dr. A. MacVicar was recently appointed medical officer of health for the village of Markdale, to succeed Dr. R. W. Lindsay, who has resigned.

At the organization meeting of the Defence Medical Association, M.D. 2 Branch, the following officers were elected: *President*—Col. M. H. Brown; *Vice-presidents*—Lieut.-Col. J. Neilson, Group Captain A. D. Kelly; *Secretary-treasurer*—Major R. M. Taylor; *Assistant Secretary-treasurer*—Major W. E. Glass. The following officers were named on the *Executive Committee*—Lieut.-Col. Magnus Spence, Capt John F. Patterson, Brig. G. Sinclair, Group Captain Clark Noble, Surg.-Comdr. John McArthur.

Brig. C. S. Thompson, Director General of Medical Services, addressed the meeting saying that the Defence Medical Association was the greatest single agency for guidance in plans formulated by the Medical Directorate whose chief object is to advise the staff and, except in purely professional matters, is capable of no independent action. He announced that military hospitals were

located in Quebec, Montreal, Kingston, Toronto, Winnipeg, and Calgary. These hospitals are to be equipped on a most complete scale. Where the concentration of troops does not warrant such a hospital, Station Hospitals of fifteen to thirty-five beds have been established for the care of minor illnesses. In still other locations, R.M.O. service is the most economical method of caring for illnesses. Where no hospital is established, complete hospitalization will be carried out by contract with the D.V.A. or civilian hospitals.

A great effort has been made to have the Active Force Medical Corps a professional as well as an administrative body. Officers entering the Corps for service are to have opportunities for keeping up with their medical studies. They will be required to refresh their professional knowledge at intervals. On entry an officer will spend a period in General Military Corps training. On completion of this, he is posted to the Field Ambulance. After that he does general duties within the Corps. Before the conclusion of his fifth year of service, he will be brought into a D.V.A. or civilian teaching hospital for one year postgraduate training. At the end of this year, he may decide whether he wishes to continue with general duties, junior appointments in a specialty, or administrative medicine. In any case, he will be required to spend a further year in a teaching hospital before he completes his tenth year in service. After that, he is given further training as is required for his chosen line. This further training includes studies for fellowships, staff college, public health and attachments to U.S. and British forces. At any time after two years of service, he may apply for a military refresher course at the medical training centre to qualify for higher rank.

The Academy of Medicine, Toronto, held a panel on the subject of venereal disease, with the following participants: Medicine, Dr. Noble Black; Religion, Reverend C. E. Silcox, Reverend Father Fullerton; Public Health, Dr. A. L. McKay, Director of Division of Venereal Disease Control, Toronto City Health Department; Education, Dr. E. A. Hardy, Board of Education; Sociology, Mr. Roger Beams, B.A., Prisoners' Rehabilitation Society; The Manufacturer, Mr. H. W. Weis, President, Canada Glazed Papers; Labour, Miss Mary McNab, Toronto District Trade and Labour Council; Law Enforcement, Chief Constable John Chisholm, Toronto Police Department; Women, Mrs. H. E. McCullagh. They concluded that, (1) prevention is much more than a medical problem; (2) the improvements necessary in sexual morals are,—an individual respect for chastity and health, an idealism that should breed good conduct, and a sense of responsibility to the community, that these can be best fostered by a concerted effort of the home, church and school; (3) capital and labour should realize their responsibility in improving working conditions, economic conditions, and conditions that favour early marriage; (4) public interest and support of organized public health is necessary; (5) the trend to punish the purveyors and organizers of commercialized vice, rather than their helpless victims, is in the right direction.

Discussion from the floor showed keen interest from the younger members of the audience, which was comprised of physicians, public health nurses, and medical students.

Letters patent have been issued re-incorporating the Ottawa Medico-Chirurgical Society so that in future it was to be known as Academy of Medicine, Ottawa. Dr. A. V. Kniewasser is the Secretary-treasurer.

A meeting of the Ontario Secretaries of the O.M.A. was held in Toronto in January. Twenty-eight out of fifty county societies were represented. Prepaid medical care was discussed; its method of administration, the existing organizations in this field, and the present coverage of the population in Ontario. Postgraduate medical education was taken up; the Central Office of the Ontario Medical Association is always happy to

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assist branch societies with interesting speakers for their scientific programs.

Dr. R. T. Noble outlined the procedure in regard to the certification of specialists by the Royal College of Physicians and Surgeons of Canada. Up to the present, 375 specialists have been registered in Ontario. At the present time it is not the policy of the College to send out lists of these, but it may be possible to publish a list in the Annual Announcement of the College.

The Joint Advisory Committee representing the College of Physicians and Surgeons of Ontario, the Ontario Medical Association, and the Universities, submitted proposed terms of reference for a Royal Commission on the Healing Arts. This has been forwarded to the Provincial Secretary for consideration. There is every hope that the personnel of this commission will be announced early this year.

A committee consisting of representatives of the Ontario Medical Association and the Workmen's Compensation Board has been appointed to review the Workmen's Compensation Board fee schedule and reporting forms.

D.V.A. Advisory Committees have been set up across the Dominion for the purpose of adjudicating problems arising either in the Department or in the provision of medical care by the physicians. The Canadian Medical Association will pay an honorarium to the members of this Committee while they meet.

Dr. R. G. Ratz who has practised in Kitchener for the past twenty-five years has moved to Ottawa where he will work in the Department of National Health.

The stated meeting of the Toronto Academy of Medicine on January 7 was addressed by Dr. Chester S. Keefer of the Robert Dawson Memorial, Boston, Mass. The subject was "Use of Antibiotic Agents in General Practice". A well attended dinner preceded the meeting.

An outstanding scientific session was held at Sunnybrook Hospital in Toronto during the week of January 20 sponsored by the Workmen's Compensation Board of Ontario. Sir Reginald Watson-Jones, of London, England, presented a four-day course on the treatment of fractures. He was assisted in the program by outstanding orthopaedic surgeons from the Province.

Over 600 doctors attended this course which was held in the new D.V.A. Sunnybrook Hospital. The spacious new auditorium was rushed to completion for the purpose of accommodating this record attendance.

Sir Reginald was entertained at dinner in the Royal York Hotel before addressing a special meeting of the Toronto Academy of Medicine on January 22. He was also entertained at luncheon by the Toronto East Medical Society on January 20.

The following officers have been appointed for the Porcupine District Medical Society, for 1947: *Past President*—Dr. G. B. Lane; *President*—Dr. C. M. Boutin; *First Vice-president*—Dr. C. R. MacLean; *Second Vice-president*—Dr. W. H. Atkinson; *Secretary-treasurer*—Dr. J. B. McClinton; *Councillors to Ontario Medical Association*—Dr. W. S. Legate and Dr. G. C. Armitage.

M. H. V. CAMERON

Quebec

Dr. B. R. Struthers, former paediatrician-in-chief at the Children's Memorial Hospital, Montreal, who was overseas with UNRRA following the war in a medical capacity, will return to Europe late in March.

Dr. Struthers has accepted an appointment with the Rockefeller Foundation, New York City. This appointment will take him to Europe where it is expected he will spend the next few years in assisting in the revival of postgraduate medical training.

The Rockefeller Foundation will continue its program of assisting medical graduates in Europe to come to North America for postgraduate training, in view of the

devastation of European university centres and the shortage of highly trained personnel and equipment there. Dr. Struthers' work will be in this connection.

Dr. K. E. Dowd, chief medical officer of the Canadian National Railways and Trans-Canada Air Lines, Montreal, has been elected Chairman of the Medical and Surgical Section of the Association of American Railroads.

In 1944 Dr. Dowd was awarded a Fellowship in the American College of Surgeons. For his outstanding contribution to aviation medicine, he was again honoured later in the same year by the Aero Medical Association of the United States with a Fellowship in Aviation Medicine. In April last, Dr. Dowd was chosen to represent the Aero Medical Association at the Provisional International Civil Aviation Organization (PICAO) meetings dealing with medical requirements of flight personnel.

During the Second War, Dr. Dowd served as Medical Consultant in Civil Aviation to the R.C.A.F. and was commissioned as Honorary Wing Commander. He also was Chief Medical Consultant of the R.A.F. Ferry Command and in charge of medical services for British Overseas Airways Corporation.

A native of Quyon, Poniac, Quebec, Dr. Dowd is a Graduate of McGill University. Following an internship at Ottawa and a number of years in the field of industrial medicine, he was appointed assistant chief medical officer of the C.N.R. in 1928. Dr. Dowd was appointed chief medical officer of the system in 1943.

La Société Médicale de Montréal vient d'élire à sa séance du 17 décembre dernier l'exécutif suivant pour 1947: docteur Edouard Desjardins, professeur agrégé à l'Université de Montréal et chirurgien de l'Hôtel-Dieu; vice-président: docteur Louis-Henri Gariépy, médecin de l'hôpital Notre-Dame; secrétaire général: docteur François Archambault, chirurgien de l'hôpital Notre-Dame; trésorier: docteur Origène Dufresne, professeur agrégé à l'Université de Montréal et médecin de l'Institut du Radium; secrétaire des séances: docteur Jean Denis, de l'Institut de Microbiologie.

Le Dr Fraser B. Gurd, de Montréal, a été élu récemment à la régie de l'American College of Surgeons pour le terme finissant en 1948.

Le Dr Maurice Giroux devient professeur titulaire d'embryologie à la Faculté de Médecine de Laval.

Le Dr St-Jean Desrosiers vient d'être élu président du Bureau médical de l'hôpital Ste-Jeanne d'Arch de Montréal. Le Dr Paul Dumas fut élu président de la Société canadienne d'endocrinologie.

Le Dr P. P. Gauthier est le nouveau président du comité exécutif de l'Hôtel-Dieu de Montréal, tandis que le Dr J. L. Riopelle devient président du Bureau médical.

JEAN SAUCIER

General

Curriculum in Anaesthesiology.—We give a very brief summary of a report on a curriculum in anaesthesiology by the Committee on Postgraduate Education American Society of Anaesthesiologists, Inc.

Postgraduate refresher courses.—Postgraduate courses in Anaesthesiology should be a minimum of three months' duration, supervised by a Diplomate or Fellow in Anaesthesiology and cover either general anaesthesia, all forms of regional anaesthesia or a combination of both. Exceptions may be made upon approval by the Board of Directors of the A.S.A.

Residencies or Fellowships in Anaesthesiology.—Because of the great current demand for anaesthesiologists, it is recommended that (1) a minimum of 2 years be spent in a residency or fellowship by candidates with no previous instruction and (2) that such instruction be supervised by Diplomates or Fellows in Anaesthesiology.



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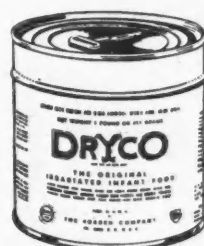
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The Committee feels, however, that candidates anticipating positions in a University or a large institution should be urged to take a 3 to 4 years' residency or fellowship. The plan of instruction will vary, depending upon medical school or non-university affiliation.

Clinical instruction.—All residents or fellows in anaesthesiology should administer a minimum of 750 anaesthetics per year under direct or indirect supervision, using all established agents and techniques for general and regional anaesthesia performed for surgery of the following categories: general abdominal, orthopaedic, neuro-surgical, thoracic, eye, ear, nose, and throat, paediatric, obstetric (including Caesarean), plastic, and surgery for the aged. They should be thoroughly familiar with the principles and practice of preoperative medication, postoperative rounds, bronchoscopy, fluid and inhalation therapy, diagnostic and therapeutic nerve blocks. A maximum of 14 days' vacation per year should be given to each resident or fellow in Anaesthesiology.

Research.—All residents and fellows in anaesthesiology should be encouraged to do original work or write a thesis, except those assigned for one year of instruction. Investigations may be of laboratory or clinical nature. The curriculum recommended indicates the growing demand for anaesthetists and the very high standards of training which are being enforced.

The full details of this report are available on application to Dr. Wesley Bourne, Chairman, Department of Anaesthesia, McGill University, Montreal.

Study of Sterility.—The third annual convention of the American Society for the Study of Sterility will be held at the Hotel Strand, Atlantic City, New Jersey, on June 7 and 8, 1947, preceding the annual A.M.A. Convention. The general theme of the meetings will be that of attempting to disseminate to the physician treating marital infertility an overall picture of the latest advances in reproduction. The convention will include original papers, round table discussions, scientific exhibits, and personal demonstrations. Registration for the sessions is open to members of the medical and allied professions.

Additional information may be obtained from the secretary, Dr. John O. Haman, at 490 Post St., San Francisco, 2, Cal.

The Twentieth Annual Spring Graduate Course in Ophthalmology and Otolaryngology will be held at the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Va., April 7 to 12, 1947.

Second International Congress of the International Academy of Legal and Social Medicine.—This triennial Congress will be held in Belgium (Brussels and Liège) from June 25 to 28, 1947, i.e., immediately after the closure of the "Journées Médicales de Bruxelles". The official languages will be English and French.

The Academy will take advantage of the opportunity thus afforded to promote a renewal of international co-operation in these fields of science where the need for it makes itself more than ever felt. This co-operation will be established on a new basis which will take largely into account the circumstances borne of the late war.

Persons who wish to present reports or read papers are begged to notify without delay either the President of the Congress: Prof. Dr. M. De Laet, Faculté de Médecine, 7, Rue de la Gendarmerie, Brussels, or one of the General Secretaries. Prof. Dr. P. Moureau, 47, Rue Villette, Liège; Prof. Dr. F. Thomas, 23, Kluyskensstraat, Ghent.

The Fourth International Congress for Microbiology will be held in Copenhagen, July 20 to 26, 1947, under the auspices of the International Association of Microbiologists.

Will anyone interested in attending the International Congress for Microbiology please notify Professor E. D. G. Murray, Department of Bacteriology and Immunology, McGill University, Montreal, Que.,

who is in charge of the committee organizing Canadian participation in the Congress.

The Fourth International Cancer Research Congress will be held in St. Louis, Missouri, U.S.A., during September 2 to 7, 1947. The Union Internationale Contre le Cancer having accepted the invitation of the American Association for Cancer Research, the Congress will be held under the joint auspices of these two organizations, with Dr. E. V. Cowdry, Professor of Anatomy, Washington University School of Medicine and Director of Research of the Barnard Free Skin and Cancer Hospital, serving as President of the Congress.

Headquarters will be at the Hotel Jefferson, St. Louis, where some three hundred rooms will be available for guests. In addition to these rooms, other nearby St. Louis hotels have signified a willingness to make reservations on advance notification by those contemplating attendance at the Congress. Dr. A. N. Arneson, St. Louis, Mo., is in charge of local arrangements.

Epidemiological Reporting Service.—The current volume of the *UNRRA Epidemiological Information Bulletin*, a bi-monthly publication since January 15, 1945, marks the cessation by UNRRA of an international epidemiological reporting service which will henceforth be carried on under the auspices of the Interim Commission of the World Health Organization.

In a last word to Bulletin readers, Dr. Wilbur A. Sawyer, for 2½ years Director of the Health Division for UNRRA, and formerly Director of the International Health Division of Rockefeller Foundation, stated:

"The time has come for transferring responsibility to a more permanent organization which can undertake a long-term development. It is with deep satisfaction and high expectations that the officers of the Health Division hand over their duties. At the same time, they wish to express their gratitude to all those officials and organizations that have co-operated with them in this important venture in international health."

According to the Bulletin, the World Health Organization, which recently received a million and a half dollar transfer of funds from UNRRA, will continue aid to needy countries for training health personnel and in the control of tuberculosis, malaria and other diseases.

Consulting doctors, nurses and other health personnel will, however, remain as part of UNRRA's operating staff in China through March, and with the displaced persons in Europe through June, 1947.

Elmer Hess Prize in Urology.—The Western New York and Ontario Urological Society announces the first annual Elmer Hess prize to be awarded at its next annual meeting. The prize includes twenty-five dollars cash, plus the winner's expenses to the meeting at which the prize paper will be read. Eligible are residents in urology or urologists with not more than two years in practice, residing in the Society's area. The paper may be on any subject, clinical or basic, related to urology, and shall be limited to 10 triple-spaced pages. Preference will be given to original work. Three copies of the papers should be mailed to Dr. N. W. Roome, 170 St. George St., Toronto 5, Ontario, before July 1, 1947.

International Union Against Tuberculosis.—A meeting of the Executive Committee of the International Union Against Tuberculosis was held in Paris on November 7, 1946. The following members attended this meeting: Professor Lopo de Carvalho, President; Professor Fernand Bezancon, Secretary General; Dr. Castello Branco, Associate Secretary General; M. Achard, Treasurer; Dr. G. Derscheid; Dr. Kendall Emerson, accompanied by Mr. F. D. Hopkins; Moltke-Nansen; First Secretary to the Norwegian Embassy in Paris, representing Professor Frolich; Dr. Morland, representing the Duchess of Portland, accompanied by Dr. Harley Williams; Professor J. Parisot, delegate World Health Organization; Dr. Telatyoki, representing Dr. Piestrzynski, accompanied by Dr. Skokowska-Rudolf.

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In accordance with a proposal made by Professor Parisot and by Dr. Kendall Emerson, the Committee adopted a memorandum to the Interim Commission of the World Health Organization, expressing the wish that a close co-operation be established between this Organization and the International Union Against Tuberculosis. After reminding his Colleagues that the Union had not been dissolved and that the Society established in Berlin in 1941 to replace it had been short-lived, the Secretary General requested them to summon a meeting of the Council of the Union. It was decided that the Council would meet in Paris on July 24 and 25, 1947, and that the scientific subject inscribed on the agenda would be the present status of research work on streptomycin.

BOOK REVIEWS

Bibliography of Infantile Paralysis. Compiled by Ludvig Hektoen, Chief Editor of the Archives of Pathology and Ella Salmonsén of the John Crerar Library in Chicago. 672 pp. \$18.00. The National Foundation for Infantile Paralysis in the United States, J. B. Lippincott, Montreal, 1946.

Every so often a book appears which is a milestone in medicine. Such is the volume under review. It covers 8,320 separate papers in the literature and gives in many instances succinct condensations of the articles listed. The volume is beautifully printed and thoroughly indexed.

On first opening such a tome one is struck by the size of the problem which poliomyelitis has presented over the years, as evidenced by the mountain of literature which it has generated. As one passes from the eighteenth century to present times one is impressed by the shift in emphasis from mere descriptions of the clinical entity to the current efforts to solve the problems of virus transmission in this and in other diseases. It is sobering indeed to thumb through thousands of references dealing with false hopes and "sure cures" which were given currency in nearly every language in the world. It makes one realize how much the practice of medicine is changed by one solid factual observation or one technical advance permitting further scientific enquiry. The isolation and identification of the virus, its transmission in experimental animals, its occurrence in faeces and sewage, months after clinical recovery, are all a far cry from the earlier writings brought to us so methodically in this amazing volume. Yet, the spirit of observation was the same, and today's researchers would be the first to admit that they saw further because they stood on the shoulders of their predecessors. In fact there is a familiar ring to Underwood's description in 1789 of the therapy then in use: "Blisters or caustics on the *os sacrum* and the great *trochanter* and volatile and stimulating applications to the legs and thighs, have been chiefly depended upon".

This is a book for every medical library, laboratory and health unit.

Hospital Care of the Surgical Patient. G. Crile, Jr., Surgeon, Cleveland Clinic and F. L. Shively, Jr., Assistant Surgeon, Cleveland Clinic. 288 pp., illust., 2nd ed. \$4.75. Charles C. Thomas Publishing Company, Springfield, Illinois; Ryerson Press, Toronto, 1946.

Comparison with the first edition shows many improvements, which means that the authors plan to keep this valuable handbook abreast of the times. The preface gives the authors' reasons for writing this book, namely to standardize techniques of routine hospital procedures and to establish principles of preoperative and postoperative care for interns and Fellows in Surgery at

the Cleveland Clinic Hospital. This handbook could readily be adopted by those hospitals which have not compiled one of their own for intern and resident staffs. It is even more important for the student to have a complete guide to the physiological principles of preoperative and postoperative care and the management of surgical complications. The student will find this book easily readable, well organized, and provided with ample references. The section on physiological principles is excellent.

The reviewer can offer a few minor criticisms. In Section II, sub-heading "S",—Thrombophlebitis, Phlebothrombosis, and Pulmonary Embolism—the discussion of femoral vein ligation is somewhat misleading. When pulmonary embolism occurs in phlebothrombosis and the patient survives, is not ligation of femoral indicated to prevent additional emboli? Then, Section IV is headed—Postoperative Care,—yet under sub-heading "P" both the preoperative and the postoperative care of the patient with hyperthyroidism are given. Would it not be more consistent to deal with operations for hyperthyroidism in the same way as operations on the stomach, the colon, the rectum, are dealt with, i.e., put the preoperative care under Section III and the postoperative care under Section IV? Or, if hyperthyroidism is considered a special case, give it a section in itself?

Mongolism and Cretinism. C. E. Benda, Director, Wallace Research Laboratory for the Study of Mental Deficiency, Wrentham, Mass. 310 pp., illust. \$6.50. Grune & Stratton, Inc., New York, 1946.

This book is a very extensive and complete review of Mongolism and Cretinism. Any one interested in an extensive study of either of these two conditions in childhood should certainly read this book. There is a chapter on the history, frequency and terminology. The chapter on physical characteristics and diagnosis contains photographs showing typical cases with excellent pictures of the diagnostic signs. There is a chapter devoted to the Nervous System in these diseases, and the chapter on endocrine disease is very interesting, opening up fields for study, research and possible therapy. Other chapters are devoted to growth and development of skull and bones and x-ray characteristics of both diseases. Haematology, Biochemistry, Prevention and Treatment are discussed in some detail. The book is well worth having as a reference for those interested in these conditions.

Narcotics and Drug Addiction. Erich Hesse. 219 pp. \$3.75. Philosophical Library, Inc., 15 East 40th Street, New York, N.Y., 1946.

The author here presents a comprehensive account of drugs to which man has had recourse in order to gain a subjective feeling of well-being which makes for forgetfulness of his troubles for a while. These drugs he divides into Narcotics and Stimulants. The former are defined as drugs the use of which involves danger of the development of an uncontrollable desire for them: the latter may be health-destroying if over-indulged in, but they do not usually result in true addiction. Dr. Hesse writes with the avowed purpose of offering an added weapon (dissemination of fuller knowledge of drugs) in the fight against addiction.

He deals with each drug from the chemical, pharmacological and toxicological viewpoint. Thus, among the narcotics he discusses opium, morphine, the pharmacological opiates, cocoa leaves, cocaine, mescaline, hashish, intoxicating peppers and toadstools and numerous other less well known drugs. Interesting statistics are produced, with cases illustrating the effects of these drugs on animals and human subjects. The account of stimulants includes alcohols, tobacco, coffee, tea, mate, guarana, cola, cocoa, betel and khat tea. The chapter on alcohols is, perhaps, particularly useful as it includes a great deal of technical detail of a medical and medico-legal import.

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This book provides an exact and scientific presentation of the subject. Perhaps what it lacks in imagination and humour, it gains in authenticity. The author's opinions appear to be typical of a German scientist and he approves of the German methods for the control of drugs (1930-1937). His statistics are drawn from German and League of Nations sources of that period.

Principles of Haematology. R. L. Haden, Chief of the Medical Division of the Cleveland Clinic, Cleveland, Ohio. 366 pp., illust., 3rd ed. \$5.00. Lea & Febiger, Philadelphia; Macmillan Co. of Canada, Toronto, 1946.

This volume of 366 pages is profusely illustrated, containing 173 original microphotographs and 95 original charts and drawings. The microphotographs are of fine quality, and the author's drawings illustrating normal and abnormal erythropoiesis are highly ingenious and instructive. This book presents a good account of the pathogenesis of anaemia, an excellent chapter on laboratory technique and contains a large number of excellent illustrations, but the remainder of the text is disappointing. It shows evidence of careless writing and poor proof reading, and it is deficient in many important particulars. There is no reference to haemolytic anaemia of the new-born, and the author explains in the preface, that he has omitted an account of the Rh factor in order "to keep this volume a simple discussion of the fundamental principles of haematology". The only information on the anaemia of lead poisoning is contained in one very brief case report. Infectious mononucleosis is incompletely described in one brief paragraph and two short case reports. It is stated that the circulating lymphocytes in this disease "tend to be large and are mature cells". There is no description of these cells which, of course, are quite unlike the lymphocytes which are found normally in the blood. Under the heading, cryptic anaemias, the author lists pernicious anaemia, anaemia from chronic bleeding, anaemia in chronic nephritis, the anaemia associated with leukaemia and idiopathic hypochromic anaemia. Surely there is nothing cryptic about these conditions. In the chapter on the cryptic anaemias, one reads: "Pernicious anaemia is responsible for many anaemias occurring without evident cause". "Pernicious anaemia is almost unknown with a coated tongue even if achlorhydria be present. It is almost the only cause for an extreme reduction in the number of red cells for which there is no apparent explanation except an idiopathic aplastic anaemia." Discriminating readers will be offended by such lack of literary style. The chief value of this book lies in the excellence of the illustrations.

Sir Frederick Banting. Lloyd Stevenson, M.D. 446 pp., illust. \$6.00. The Ryerson Press, Toronto, 1946.

It was the destiny of Frederick Banting in his scientific achievement and in his person to bring Canadian medicine to the attention of the world. How this came about provides a story that is of captivating interest, not only in relating how a quiet man was forced by circumstance into the rôle of a celebrity, but also for the light it throws on the larger matters of Canadian thought and feeling. For these reasons this must be hailed as a notable book. As a major biography of a contemporary Canadian, it foreshadows the coming age in this country of critical writing, a most important part of national literature, and one in which Canada has been notably lacking. For there are such things as a Canadian tradition, and a Canadian national character, but to date these have failed to find any distinctive expression in literature. For that reason outsiders find Canada a most baffling place to understand. The real cause of this difficulty must be traced to the fact that Canada has no national culture. Distinctively Canadian values and a Canadian way of life do exist, but because this country has not yet set itself to the task of expressing these things through its writers and artists, the world does not know us, and by the same token Canada herself has not become conscious of her own nature and stature.

This life of Banting therefore must be rated as a

significant achievement, for Dr. Stevenson has written a good and honest book about a representative contemporary Canadian and about the society in which he lived. It is a biography that definitely has literary form and substance. While it follows for the most part the modern form of semi-fictional biography of the magazine and screen, and is over-dramatized in places, it rises above the limitations of this formula by the excellence of the writing, the wealth of its references and its understanding and expression of the Canadian scene. Thus while written in the popular idiom and therefore capable of appeal to the public at large, the more careful reader will note that the author has skilfully provided within the framework of a popular mode of writing a thoroughly documented account of the more serious scientific matters in which Banting was engaged. There is brilliant and scrupulously fair use of sources, and the medical reader can if he wishes pass over the costume part of the story and find a detailed treatment of research problems in diabetes, silicosis, cancer or aviation medicine which will satisfy his scientific soul. This ability to move in both worlds seems to the reviewer the real achievement of this book. Not only that, but in places the writing rises to a distinguished level which is rare in books of this type. Banting thus has a biographical monument which can challenge comparison with Flexner's life of Welch, and the recently published life of Harvey Cushing by Fulton.

Here, then, is something better than a conscientious, documented memoir. It is a very lively and human portrait of a peculiarly Canadian individual drawn by a fellow physician. Stevenson sets down the character of a Canadian—serious-minded, essentially quiet-spoken and reserved, capable of a master passion for work, possessed of many interests. It is the tale of a man with talent who realized his ambition by courage and a certain stubbornness, and who all the while drew strength from the deep remembrance of things past and from the heritage which came to him from that source of so much of value in Canadian life—the small Ontario town. Thoreau's words express perfectly the way in which Banting composed his life: "Know your own bone; gnaw at it, unearth it and gnaw it still".

Four things stand out for the reviewer of this book. The ease with which the author has marshalled his vast amount of material and lighted it with interest, abundant allusion and great understanding. The fine discussion of Banting's work as an artist. The chapter telling the story of the discovery of insulin candidly and fully. The account in some of the details may be controversial, but other individuals who took part in these events will have to debate this. And finally the dramatic tale of the fatal aeroplane crash in Newfoundland and Banting's tragic death.

This was a hard book to write. Anyone who has endeavoured to write the life of a contemporary knows this. If a slenderly equipped critic may say so, Dr. Stevenson has done it well. We are grateful to him for a full-portrait of a man who many in this Dominion knew, but hardly appreciated. In volumes such as this, Canada at last is becoming articulate. We are learning to understand ourselves. That is the really exciting significance of this book.

BOOKS RECEIVED

Memoir to the Academy of Sciences at Paris on a New Use of Sulphuric Ether, 1847. W. T. G. Morton; with a Foreword by J. F. Fulton, Yale University. 24 pp. \$1.50. Henry Schuman, New York, 1946.

Modern Treatment Year Book 1946. Edited by Sir Cecil Wakeley, Fellow of King's College, London. 192 pp., illust. \$3.50. The Medical Press, London; Macmillan Company of Canada, Toronto, 1946.

Syndrome Cortico-Pleural. J. Skladal, Professeur de Physiologie Clinique à l'Université de Prague. 144 pp., illust. 160 fr. Masson et Cie, Editeurs, Paris, 1946.